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BRANAS (M.) & BERNON (G.). **Note sur deux cas de dépérissement et leur relation avec la présence de certains champignons dans le vieux bois de la Vigne.** [A note on two cases of wilt and their relation to the presence of certain fungi in old wood of the Vine.]—*Ann. École Nat. d'Agric. Montpellier*, N.S., xxii, 4, pp. 331–334, 1933.

An account is given of two forms of wilt affecting young vines in France. In one case the vines, growing in soil previously under lucerne for nine years, were greatly weakened and the roots much reduced; some died in 1932, more in 1933, and the vines planted to replace these in turn succumbed. Extensive black areas were present towards the inside of the vascular ring at the base of the trunk and in the roots, the lesions becoming less marked the more remote they were from the collar. The affected material contained the septate mycelium of a *Fusarium* which was demonstrated to penetrate vine roots and trunks through wounds, to be transmitted through soil, and to attack lucerne.

The second case somewhat resembled a *Verticillium* wilt, the leaves curling up, withering, and falling prematurely; the branches failed to develop properly in August, and the vines gradually died. Old vines in proximity to the affected ones contracted the infection. Internal lesions resembling those noted above were present near the collar, and a septate mycelium was observed in the affected parts. There was evidence that infection was soil-borne. Further investigations are in progress.

[This paper also appears in *Prog. Agric. et Vitic.*, c, 52, pp. 626–628, 1933.]

MANZONI (L.). **Attenti al roncet!** [Attention to roncet!]—*Battaglie Rurali*, ii, 3, p. 2, 1933.

After stating that 'roncet' or leaf roll of the vine has recently become prevalent in the province of Venice, where it was formerly almost unknown, the author describes the symptoms of the disease, which he attributes to a filterable virus and the spread of which in Italy he considers to be due to the introduction of susceptible American vines [*R.A.M.*, xii, p. 418].

The available evidence points to the existence of natural infection through the soil, though transmission to healthy vines in proximity to diseased ones was not observed [ibid., xi, p. 21].

The only method of control at present known consists in examining the mother vines regularly and systematically for the presence

of the endocellular cordons diagnostic of the condition [ibid., xiii, p. 214], destroying those that show their presence and, if the disease is quite clearly present in the soil and not merely introduced, abandoning the whole vineyard. Plantings used for reproduction should be frequently renewed on fresh soil, and American vines, such as Rupestris du Lot, should be used as little as possible.

Bosc (M.). **Action curative et adhésivité de certaines bouillies cupro-ammoniacales.** [The curative action and adhesiveness of certain cupro-ammoniacal mixtures.]—*Prog. Agric. et Vitic.*, c, 48, pp. 532–534, 1933.

Spraying tests against vine mildew (*Plasmopara*) [*viticola*] carried out since 1930 with mixtures of copper sulphate and ammonium sulphate solutions showed that the best results as regards adhesiveness, fungicidal efficiency, and freedom from scorching were given by a colloidal spray material (the adhesiveness of which was successfully demonstrated on glass and porcelain) consisting of copper sulphate and carbonate of soda, each 2 kg., and ammonium sulphate 1 to 1·5 kg. in 100 l. of water; the wetting property of this mixture was, however, improved when the proportion of copper sulphate and carbonate of soda was increased to 3 kg. The sulphate of ammonia should be as neutral as possible and preferably synthetic.

A large number of vines treated with this spray in 1933 still retained their leaves (which bore distinct traces of copper) on 1st November, although they had been very badly flooded in September.

Salmon (E. S.) & Ware (W. M.). **Department of Mycology.**—*Journ. South-Eastern Agric. Coll., Wye, Kent*, xxxiii, pp. 17–27, 1934.

From carrots bearing large, sunken, black areas, covered by the unbroken skin and showing an internal black rot, the authors isolated three fungi, including an *Alternaria* which may prove to be the radish black rot organism *A. radicina* [*R.A.M.*, ii, p. 5; ix, p. 82; xii, p. 72].

Mature ascospores of *Venturia inaequalis* were ejected from overwintered apple leaves in Kent on 9th May, and the first conspicuous attack on the new foliage was seen on 13th May. Mature conidia of *V. pirina* were found on 15th March on the spur wood and at the base of the wood buds of Louise Bonne pear trees; on the same date fallen pear leaves bore perithecia in which many asci were mature and ejecting ascospores. On 12th April the *Fusicladium* stage was present on pedicels and calyx lobes of pear blossoms and on the young leaves.

On two Kentish farms wilted Fuggles hops showed the mycelium of *Verticillium albo-atrum* [ibid., viii, p. 546] in the wood vessels in the lower portion of the bine. Fuggles cones were attacked, as in 1929, by a *Cladosporium*, the mycelium and spores of which occurred commonly on the bracts, and occasionally also on the bracteoles, producing a brown discoloration of the petals extending in lines down the cone, very similar to that caused by downy mildew [*Pseudoperonospora humuli*].

An apparently severe form of split leaf [ibid., xi, p. 744] attacked Fuggles and Golding hops, yellowish, oily spots appearing on the lamina, which was so thin that the tissue either died and turned brown or split; leaves on the main bine and on laterals were affected.

In preliminary investigations of the fungus usually known as *Xylaria vaporaria*, which forms large black sclerotia in the casing soil of mushroom beds, but does not as a rule produce spores [ibid., x, p. 8], it was found that, when experimentally induced to fructify, certain differences from the original description of *X. vaporaria* were constantly present.

BAUDYŠ (E.). **Fytopatologické poznámky VIII (za rok 1932).** [Phytopathological notes VIII (for 1932).]—*Ochrana Rostlin*, xiii, 3–4, pp. 90–102, 5 figs., 1933. [German summary.]

Continuing his seasonal notes on plant diseases in Czecho-Slovakia, the author states that mosaic diseases were again very prevalent and severe in 1932 on a number of cultivated plants [*R.A.M.*, xi, p. 424], among which a new record for south Moravia is stated to be a mosaic of tomatoes outwardly strongly recalling acute potato mosaic; the leaves on the affected plants bent down, remained stunted, turned yellow, and died. Red clover [*Trifolium pratense*] suffered widely from vein mosaic, a similar condition being also observed in dahlias. This prevalence of mosaics is attributed in part to the drought which has prevailed in the country for several years, and partly to the fact that, owing to the local agricultural crisis, the great majority of the growers are unable to fertilize adequately their lands. The same causes are believed to have been also responsible for the severe development in 1932 of other crop diseases, such as cereal rusts (*Puccinia* spp.), among which wheat black rust (*P. graminis tritici*) was particularly widespread. Feeding experiments showed that heavily rusted wheat straw did not injuriously affect cattle fed on it.

Seventh Annual Report of the Commonwealth Council for Scientific and Industrial Research for the Year ended 30th June, 1933, 87 pp. [?1933].

In the section of this report dealing with plant diseases (pp. 21–26) it is stated that during the period under review tests were conducted in Australia to determine the mode of inheritance in wheat to flag smut [*Urocystis tritici*]. The evidence obtained indicated that breeders are unlikely to secure results by testing before the F_3 generation. Segregation for reaction to the fungus occurs, but the genetic factors for resistance may differ with the variety.

Of 813 wheat varieties tested, 20 showed tolerance to *Helminthosporium sativum*; of 849 varieties, none was resistant to *Ophiobolus graminis*; and of 987 varieties, 40 were apparently resistant to *Fusarium culmorum*. Preliminary tests with the organisms causing root rots of wheat indicated that *O. graminis* and *F. culmorum* are relatively the most, and *Wojnowicia graminis* the least, pathogenic. The root and foot rot due to the combined attack of *U. tritici* and *F. culmorum* [*R.A.M.*, xiii, p. 294] caused

the death of seedlings at low temperatures when normally *F. culmorum* alone would have little effect, its optimum temperature range for disease production being from 64° to 77° F.

In the last five seasons 56 commercial tomato varieties have been found susceptible to spotted wilt [ibid., xiii, p. 333]. Early Red Dwarf showed partial resistance and is being crossed with Marglobe, Sensation, and other good commercial varieties.

During the past two years the disease of pine trees [*Pinus* spp.] known as 'needle fusion' [ibid., ii, p. 298] has been noted in South Australia, Tasmania, and New South Wales. It is most severe in coastal plantations, where 20 per cent. of the older trees are often affected. The disease is apparently infectious and is evidently more prevalent on pines growing under adverse conditions than on those growing vigorously. No organism has so far been found associated with it.

NOBLE (R. J.). **Australia: summary of plant diseases recorded in New South Wales for the season 1932–1933.**—*Internat. Bull. of Plant Protect.*, viii, 1, pp. 3–5, 1934.

Notes are given on the prevalence of disease among cereal and other field crops, fruit, vegetables, and miscellaneous plants in New South Wales during 1932–3. Collar rot of citrus (*Phytophthora parasitica*) [*R.A.M.*, xiii, p. 25] was reported and the same crop suffered from Californian dry root rot [cf. ibid., ix, p. 628]. Fig mosaic [ibid., xiii, p. 252] is widespread but generally unimportant. Pecan rosette [ibid., xiii, p. 135] was recorded for the first time. Bananas were sporadically attacked by *Armillaria mellea* [ibid., xii, p. 552]. Mosaic occurred on *Zinnia* [*elegans*: cf. ibid., xiii, p. 166] and Iceland poppy (*Papaver nudicaule*), while delphiniums were infected by bacterial leaf spot (*Bacterium delphinii*) [ibid., ix, p. 436]. Mushrooms (*Agaricus* [*Psalliota*] *campestris*) were damaged by 'bubbles' (*Mycogone perniciosa*) and the crop reduced by plaster mould (*Monilia* [*Oospora*] *fimicola*) [ibid., xiii, pp. 7, 213].

RUSSELL (T. A.). **Report of the Plant Pathologist, 1933.**—*Rept. Dept. of Agric., Bermuda, for the year 1933*, pp. 28–36, 1934.

The celery crop in Bermuda again suffered heavy damage in 1933 from blight (*Septoria apii*) [*R.A.M.*, xii, p. 421], only a small area in Southampton surviving the attacks of the fungus. A virulent source of infection was provided by the early crop, started in Canada and transplanted in Bermuda in the autumn of 1932, which was practically destroyed in the following January.

Sclerotinia sclerotiorum was observed on glasshouse cucumbers, apparently a new host for the Island. Sclerotia obtained from a rotted cabbage on 19th February developed apothecia after seven weeks under humid conditions in the laboratory, and on 1st March apothecia were found in the field. *S. sclerotiorum* is much the most important agent of decay in carrots during the winter, but causes no loss among those dug in June. No significant cultural differences were detected between isolations of the fungus from carrot, cabbage, celery, and tomato on carrot agar.

MARTYN (E. B.). **Report of the Botanical and Mycological Division for the year 1932.**—*Divisional Repts. Dept. of Agric. British Guiana for the year 1932*, pp. 117–121, 1934.

The very slow spread of mosaic on D. 625 sugar-canes in British Guiana [*R.A.M.*, x, p. 361], where no control is practised and the infected fields have been continued to the fourth and fifth ratoons, in spite of which good yields have been maintained, indicates that this variety is definitely resistant.

The fungus associated with the disease known locally as 'man rice' [ibid., xii, p. 11] was identified at the Imperial Mycological Institute as a strain of *Fusarium moniliforme* [*Gibberella moniliformis*]; the 2- to 4-, mostly 3-septate macrospores measured 26·4 to 49·5 by 3·3 to 4·9 μ, and the non-septate microspores 6·6 to 13·2 by 3·3 to 4·9 μ, these measurements agreeing fairly well with those of the organism causing a similar but more severe disease in Madras [ibid., x, p. 336; xii, p. 266] and with those of the conidia of *Lisea* [*G.*] *fujikuroi*, causing 'bakanae' disease in Japan [ibid., xiii, p. 323].

From the diseased inflorescences of Demerara Creole rice affected by a spotting on the paleae, which turned brown or black, the whole spikelet drying up, the author isolated *Acrothecium lunatum*, which causes a similar disease of rice on the Gold Coast [ibid., vi, p. 144]. A *Fusarium* and *Clasterosporium punctiforme* were also obtained from the diseased inflorescences.

Liberian coffee from Demerara was affected with phloem necrosis [*Phytomonas leptovasorum*: ibid., xiii, p. 28]; until recently, only isolated bushes were attacked in British Guiana, but in 1932 a more extensive outbreak occurred in the North West District.

Papaw seedlings were affected by a disease resembling curly leaf [ibid., x, p. 810].

Division of Botany.—*Fifty-second Ann. Rept. New York (Geneva) Agric. Exper. Stat. for the year ended June 30, 1933*, pp. 27–42, 1934.

In further studies of raspberry diseases conducted at Geneva, New York, on a group of red raspberry seedlings [*Rubus idaeus*] of varying parentage after four seasons' spread of mosaic diseases, it was found that Cuthbert as a parent contributed susceptibility to red mosaic [*R.A.M.*, xii, p. 770] to a greater degree than any other parent represented. The June and Marlboro varieties also contributed susceptibility to red mosaic. Used as parents these three varieties also contributed a lack of 'klendusity' [ibid., xiii, p. 249] to red mosaic, while the Newman-Herbert crosses showed the highest degree of this quality. Injury from this disease can be much reduced if high vigour is maintained in a planting of resistant varieties. Mosaic-free stocks of the resistant red variety Latham and the black [*R. occidentalis*] variety Cumberland, and trial plantings of the new mosaic-escaping red variety Newburgh [ibid., xii, p. 204] are recommended for use. Susceptible varieties lacking klendusity cannot be protected by isolation and roguing where such high rates of spread prevail as in the Hudson Valley.

In the western parts of New York wild red raspberries are commonly affected with mosaic and serve to infect healthy cultivated

stock; wild black raspberries and wild blackberries [*R.* spp.] do not, however, appear to be serious sources of infection.

Inoculation experiments demonstrated that the mild mottling universally present on Columbian purple raspberries [*R. neglectus*: ibid., vii, p. 36] is an expression of red raspberry mosaic, the red mosaic virus not being in the least attenuated or weakened by existence in the resistant Columbian host.

Anthracnose [*Plectodiscella veneta*: ibid., xii, p. 456] causes damage in most plantings of black and purple raspberries in western New York; an annual delayed dormant spray with lime-sulphur (1 in 10) is recommended for control.

Leaf mould of tomatoes [*Cladosporium fulvum*: ibid., xiii, p. 134] was observed to be present in field crops, though usually confined to the greenhouse in New York State.

Spraying tests against apple scab [*Venturia inaequalis*: ibid., xi, p. 788; xii, p. 204] indicated that lime-sulphur should be used until blossoming but the advisability of using it subsequently depends on the severity of the infection, orchard practices, and individual factors. Wettable sulphurs, such as flotation sulphurs, dry-mix, and kolofog, are in general safe substitutes for liquid lime-sulphur, though the last-named is the only spray recommended for use after infection periods or where the disease is established. An effective strength for lime-sulphur in the conditions prevailing in the Hudson Valley would appear to be 1 in 60; considerable evidence showed that the formula for dry-mix may be safely reduced from 16–8–½ to about 10–3–½. Extensive tests indicated that dusts, wettable sulphur, or Bordeaux mixture (2–6–100) may safely be applied to apples during bloom; varieties differed, however, in the percentage of fruit set with this practice.

In the Hudson Valley many factors, any of which may be a limiting factor, may be concerned in the production of fungicidal injuries in apple orchards. Some orchards are highly susceptible, regardless of the variety grown. Dry lime-sulphur caused less injury than the liquid form, but the wettable sulphurs gave the best results in this respect. Cal-mo-sul [ibid., x, p. 224] markedly reduced the copper injury in Bordeaux mixture, but not enough for calyx applications.

Ceresan when applied to moist wheat seed commonly caused abnormal germination, at least 50 per cent. of the seeds being so weakened that the seedlings consisted of short, clubbed roots and plumules; the injury is attributed to the dusting of the seed when damp and to improper storage (especially of chipped or cracked seed) after treatment.

A form of *Ustilago tritici* obtained from W. F. Hanna at Winnipeg [ibid., xi, p. 443] produced no infection on Honor wheat but caused heavy infection on the Reward variety inoculated at the same time. On the other hand, a form collected in New York on Honor produced heavy infection on the same variety, but none on Reward.

Division of Plant Pathology.—*Forty-third Ann. Rept. Washington Agric. Exper. Stat. for the fiscal year ended June 30, 1933* (*Bull.* 291), pp. 42–44, 1934.

Further studies have been conducted by F. D. Heald, E. F.

Gaines, and C. S. Holton on physiologic specialization in *Tilletia tritici* and *T. levis* [*T. caries* and *T. foetens*: *R.A.M.*, xii, p. 204], and a monograph on the present status of the bunt problem is in preparation.

The storage rot of apples caused by blue mould [*Penicillium expansum*] has continued to engage the attention of F. D. Heald and K. Baker [ibid., xii, p. 574].

Brown rot of sour cherries (*Sclerotinia cinerea* [forma] *pruni*) [ibid., xiii, p. 33] caused severe blossom blight, followed by almost complete killing of the fruit spurs. Western yellow rust (*Phragmidium imitans*) [ibid., xii, p. 678], succeeded by cane blight (*Leptosphaeria coniothyrium*) [ibid., xiii, p. 174], did unusual damage to raspberries.

GUERRERO (J.). **Report of the Assistant in Agronomy and Horticulture.**—*Rept. Guam Agric. Exper. Stat., 1930-31, 1931-32*, pp. 11–20, 2 figs., 1933. [Received March, 1934.]

The following items of phytopathological interest occur in this report. The best control of citrus scaly bark (psorosis) [*R.A.M.*, xiii, p. 90] and gummosis has been obtained by thoroughly scraping the infected areas with a knife, disinfecting the wounds with bichloride of mercury (1 in 500 in a 25 per cent. aqueous solution of ethyl alcohol), and applying a weak solution of carbolineum. In the event of reinfection, the wounds should again be scraped and coated with a paste made by mixing either calcium carbide residue or lime with the carbolineum.

Sclerotium rolfsii caused a heavy reduction of the tomato crop on experimental breeding plots.

Report of Mr. F. Stell, Mycologist, Department of Agriculture, on his visit to Ecuador to study witchbroom disease (Marasmius perniciosus) of Cocoa.—*Trinidad and Tobago Council Paper No. 137 of 1933*, 12 pp., 1 map, 1 graph, 1934.

Witches' broom of cacao (*Marasmius perniciosus*) [*R.A.M.*, xii, pp. 143, 522] was first discovered in Ecuador in 1921 in the Balao district, where it spread so rapidly that in 1933 all the plantations inspected by the author were heavily infected, with many fallen twigs and pods bearing numerous sporophores. All attempts at control having failed, general maintenance work had been largely curtailed and many estates abandoned. On three estates where the yields in 1921 had amounted, respectively, to 11,000, 8,000, and 5,100 quintals they had fallen in 1932 to 850, 1,600, and 200 quintals, while three others which in the former year yielded, respectively, 30,628, 11,078, and 4,067 quintals, in 1925 yielded 883, 81, and 3 quintals only.

In 1923, one very healthy tree, of the 'Cojon de Toro' or 'Calabacillo' type (classified by Van Hall as a Forastero cacao), was found among thousands heavily infected; transplants proved to be almost immune, but owing to the poor quality of the produce the planting of this type of cacao was not extended on a large scale. In 1924, another tree, an importation from Venezuela of a type known in Ecuador as 'Zambo' (a sub-variety of Forastero), was found to be immune, though the progeny are attacked to some

extent. In this case also the pods were of poor quality. Later, another variety, which has been termed No. 5 and is, apparently, not mentioned in cacao literature, was found to be highly resistant and to give a crop of much better quality. A fourth type showing resistance is known as Soconusco; this variety gives the best produce of the resistant types so far encountered.

A million transplants from seed of different resistant types were completed in one group of plantations in 1933, and the oldest plants, which are six to seven years old, have shown very high resistance to *M. perniciosus*; the yield of pods is at least three times that of the old plantations.

On one large estate about 80 per cent. of 500 seedlings of a strain known locally as 'Venezuela Nacional', derived from several trees that had been observed to show resistance, showed marked resistance; a 4,000-tree block was established from this strain and a large majority of the trees, now five years old, still maintain a high degree of resistance.

The *Monilia* disease of cacao [*M. roreri*: ibid., xiii, p. 292] is probably indigenous to Ecuador, as it has been found there on wild cacao (*Theobroma bicolor* and *T. balaensis*) and is unknown elsewhere. Only the pods are attacked, the vegetative tissues being apparently immune. When affected, the small pods develop a slight protuberance or become discoloured, and greyish veins are visible on the cut surface; diseased pods are heavier than healthy ones of equal size and are difficult to cut, the interior layer of the shell being hard. The shell itself, when cut, shows black or yellowish zones and sometimes small water cavities or areas surrounded by a well-defined yellowish line. The seeds of affected pods are useless. Infection is most serious near the Andes, where in some localities 95 per cent. of the pods are worthless.

An extract from a report on the *Monilia* disease by J. B. Rorer is appended, and a map, which also indicates rainfall, is given of the cacao areas of Ecuador.

Die wichtigsten starken Schäden an Getreide im Jahre 1933. [The principal severe damage to cereals in the year 1933.]—*Nachrichtenbl. Deutsch. Pflanzenschutzdienst*, xiv, 1, pp. 3–4, 2 maps, 1934.

Notes are given on the prevalence of a number of well-known fungous diseases and insect pests of cereals in Germany during 1933, the distribution and incidence of barley stripe (*Helminthosporium gramineum*) and the foot rots (*Leptosphaeria herpotrichoides, Ophiobolus herpotrichus,* and *Fusarium* spp., chiefly affecting wheat) [*R.A.M.*, xiii, p. 154] being shown by maps.

PETIT (A.). **Résultats expérimentaux sur la préservation des céréales contre les parasites cryptogamiques en Tunisie.** [Experimental results on the protection of cereals against cryptogamic parasites in Tunis.]—*Rev. Path. Vég. et Ent. Agric.*, xx, 6–7, pp. 210–260, 1933. [Received March, 1934.]

The author describes in detail the results of his tests of a very large number of chemical compounds for the seed treatment of cereal diseases, attention being paid in particular to toxicity to

spores present on the seed, preservation of germinability, and protection against soil-borne organisms and insects. He concludes that *Urocystis tritici*, *Tilletia levis* [*T. foetens*], and *T. tritici* [*T. caries*] on wheat, *Ustilago hordei* on barley, and *U. avenae* on oats can be satisfactorily checked by seed disinfection with certain dusts containing copper, the best for general efficiency being copper arsenite. Against loose smut of wheat (*U. tritici*) the hot water treatment alone is effective. Against the rusts *Puccinia glumarum* and *P. triticina* the selection of resistant varieties of wheat appears to be the most fruitful method of control.

McDonald (J.). **Two new records of physiologic forms of Wheat-stem rust in Kenya colony.**—*Trans. Brit. Mycol. Soc.*, xviii, 3, pp. 218–222, 1933.

In this brief note the author records the occurrence in Kenya of two additional physiologic forms of wheat black rust (*Puccinia graminis tritici*) [*R.A.M.*, x, p. 507; xiii, p. 217], namely, form K3 and form K4. The reaction to inoculation of certain American differential host varieties [the details of which are briefly described and discussed] indicated the probability that form K3 is identical with the American form 34 [ibid., xii, p. 556], while K4 exhibited a close general similarity to form 116, produced artificially in Canada by hybridization [ibid., xii, p. 14].

Milan (A.). **Delle infezioni per 'Ustilago tritici' (Pers.) Jens. e di una facile procedura per ottenerle artificialmente.** [On infections by *Ustilago tritici* (Pers.) Jens. and an easy method of obtaining them artificially.]—*Nuovo Giorn. Bot. Ital.*, N.S., xl, 4, pp. 539–547, 1 pl., 1933. [Received April, 1934.]

A simple method devised by the author for inoculating large numbers of wheat plants at a time with *Ustilago tritici* consists in removing the middle florets from each spikelet, together with the end spikelets, the glumes of the remaining florets and finally the anthers, afterwards sprinkling the plants with the spores at intervals. Used to inoculate wheat of several varieties in pots, boxes, and the field, this method gave 95 to 100 per cent. infection. It may very conveniently be used in genetical studies, as it renders possible simultaneous hybridization and inoculation on a large scale.

Briggs (F. N.). **Inheritance of resistance to bunt, Tilletia tritici, in Sherman and Oro Wheat hybrids.**—*Genetics*, xix, 1, pp. 73–82, 3 graphs, 1934.

Data are presented showing that the Sherman and Oro hybrid wheat varieties differ from the susceptible Baart in one major factor for resistance to bunt (*Tilletia tritici*) [*T. caries*: *R.A.M.*, xii, p. 84]. In Sherman this factor was identified as the Martin factor (the genetic constitution may be expressed *MM hh tt*), which also governs the reaction of Martin, White Odessa, Banner Berkeley, and Odessa, while in Oro the resistant factor was found to be identical with the Turkey factor (*mm hh TT*), also operating in Turkey 1558 and 3055 [ibid., xiii, p. 20]. Hussar and selections 1418 and 1403 from Hussar × Hard Federation are governed,

respectively, by the Martin and Hussar factors (*MM HH tt*) and the Hussar factor alone (*mm HH tt*).

The results of other workers on the inheritance of resistance to bunt are analysed [cf. ibid., xi, pp. 33; xii, pp. 17, 85, *et passim*], and in this connexion the desirability is suggested of further genetic studies on resistant varieties, and of the accumulation of more data on physiologic forms of *T. caries*, care being taken to use pure lines.

BROADFOOT (W. C.). **Studies on foot and root rot of Wheat. III. Effect of crop rotation and cultural practice on the development of foot rot of Wheat.**—*Canadian Journ. of Res.*, x, 1, pp. 95–114, 2 diags., 1934.

Further observations [details of which are given] made between 1928 and 1932 over a wide range of soil and climatic conditions in western Canada on the foot and root rots of wheat primarily associated with *Helminthosporium sativum* and *Fusarium* spp. [*R.A.M.*, xii, p. 684] showed that, under the experimental conditions which closely approximated to ordinary farm practice, there was a marked decrease in the incidence of the disease accompanied by an increase of yield where wheat followed summer fallow. The degree of infection ('infection rating') was determined by a statistical method in which the conditions of the crown and secondary roots was used to furnish a numerical basis. This was supplemented by the determination of the total number of culms, number of fertile culms, and yield. No additional benefit was derived from extending the period of summer fallow from one to two years. An oat crop in place of the fallow was equally effective, and here again one crop was sufficient. Two crops of sweet clover [*Melilotus alba*] preceding wheat acted similarly on the latter to one of oats or summer fallow. Foot rot was found to be less prevalent in late- than in early-sown wheat.

BROADFOOT (W. C.). **Studies on foot and root rot of Wheat. IV. Effect of crop rotation and cultural practice on the relative prevalence of Helminthosporium sativum and Fusarium spp. as indicated by isolations from Wheat plants.**—*Canadian Journ. of Res.*, x, 1, pp. 115–124, 1934.

The crown and root tissues of 43,305 out of 47,360 wheat plants examined in the course of the writer's studies on foot and root rot in western Canada [see preceding abstract] yielded *Helminthosporium sativum*, *Fusarium culmorum*, and *F.* spp., with or without other fungi, including *Wojnowicia graminis* [*R.A.M.*, xiii, p. 295] and *Ascochyta graminicola*. None of the various crop sequences or cultural practices employed in this series of experiments appeared to affect significantly the relative prevalence either of *H. sativum* or *F.* spp. in the crown tissue. It was inferred, however, from the marked tendency to predominance of one or other of these organisms at certain stations each year, that environmental factors are of importance in determining their relative incidence.

CHRISTENSEN (J. J.) & STAKMAN (E. C.). **Fungi and bacteria on Barley.**—Abs. in *Phytopath.*, xxiv, 1, pp. 4–5, 1934.

Many of the 200 isolants from eight genera of fungi inoculated into barley plants at the Minnesota Agricultural Experiment Station caused leaf and sheath lesions and kernel discolorations. Secondary invasions, especially by *Alternaria* spp., were common, and several bacteria were also found to be pathogenic. Fungi representing over 20 genera were isolated from some 500 samples of barley seed. In 1932 *Fusarium* and *Helminthosporium* spp. were responsible for about 50 per cent. of the shrivelling and discoloration of the kernels, and in 1933 for approximately 30 per cent., the latter being the more prevalent of the two genera in both seasons. Good results were obtained by seed treatment with ceresan.

GORDON (W. L.). **A study of the relation of environment to the development of the uredinial and telial stages of the physiologic forms of Puccinia graminis avenae Erikss. and Henn.**—*Scient. Agric.*, xiv, 4, pp. 184–237, 5 pl., 16 diags., 2 graphs, 1 map, 1933.

In this paper a detailed account is given of further studies in Canada of nine physiologic forms of oat stem rust (*Puccinia graminis avenae*) [*R.A.M.*, xii, p. 280], with special reference to the relation of environmental factors to the development of the uredo and teleuto stages. The results obtained [which are tabulated, expressed graphically, and fully discussed with numerous references to the relevant literature] may be briefly summarized as follows.

The temperature (12° to 28° C.) at which Victory, White Russian, and Richland oats were grown before inoculation of the seedlings had no appreciable effect on the types of uredo infection produced by forms 1 to 9 [ibid., x, p. 176]. At 12° Joanette Strain was resistant to forms 1, 3, 4, and 5, while at 28° it was completely susceptible to all nine forms. Only at low temperatures did forms 1, 3, 4, and 5 produce characteristic infection on Joanette Strain. As certain forms can only be separated from one another by the reaction to them of this variety and then only at low temperatures which may be inconvenient in practice, the following grouping is suggested: group I, forms 1, 2, and 5, group II, forms 3 and 7, group III, forms 4 and 6. The forms comprising each group differ only in the types of uredo infection which they produce on Joanette Strain at a relatively low temperature. There is very little difference between forms 1 and 5 at all temperatures, and at relatively high temperatures forms 3 and 7 are indistinguishable. Forms 8 and 9 are identifiable under ordinary greenhouse conditions.

Both on seedlings and mature plants all the physiologic forms developed teleutospores more rapidly at 24° to 28° than at 12° to 16°. Forms 3, 4, 6, 7, 8, and 9 produced teleutospores much more rapidly than forms 1, 2, and 5; as the former group is the more virulent, there appears to be a correlation between pathogenicity and rapidity of teleutospore formation.

The rarity of forms 3, 4, 6, 7, 8, and 9 in Canada may be due to

the early development of teleutospores, the period of uredospore production being curtailed and the amount of inoculum diminished. Further, teleutospores formed in hot weather may not be germinable.

The stage of development reached by the host was not a limiting factor in the production of teleutospores by any of the forms.

A relative atmospheric humidity of 80 per cent. increased the extent and rate of teleutospore development on oat seedlings, and one of 40 per cent. slightly increased the rate on mature plants.

Ultra-violet radiation had no significant effect on uredospore or teleutospore formation [ibid., viii, p. 516; xi, p. 563].

NICOLAISEN (W.). **Die Grundlagen der Immunitätszüchtung gegen Ustilago avenae (Pers.) Jens.** [The bases of breeding for immunity from *Ustilago avenae* (Pers.) Jens.]—*Zeitschr. für Züchtung*, A, xix, 1, pp. 1–56, 1934.

A comprehensive, fully tabulated account, supplemented by a bibliography of 212 titles, is given of the writer's continued investigations (1930–2) at the Halle University Agricultural and Plant Breeding Institute on the fundamental aspects of breeding and selection for immunity from loose smut of oats (*Ustilago avenae*) [*R.A.M.*, xiii, p. 318], in which nearly 150,000 plants were inoculated with spores and at least 34,000 with mycelium. Reed's method [ibid., ix, p. 102] gave further proof of its superiority to any other standard technique for experimental work on breeding for oat smut immunity.

The actual occurrence of smutted panicles is the criterion whereby reaction to *U. avenae* should be gauged, 'latent infection' [ibid., xii, p. 209] being only of theoretical importance in this connexion. The number of resistant oat types is narrowly limited by the existence of many physiologic strains of loose smut. However, the synthetic development of selections immune from all the physiologic strains of *U. avenae* may ultimately be realized on the basis of a knowledge of the heritable specific resistance to a given strain. Within the species *A. sativa* and *A. byzantina* are varieties suitable for hybridization with this end in view.

A summary is given of the knowledge at present available on sex and cytology in *U. avenae* [ibid., xii, p. 17]. In connexion with the genetic analysis of mono- and bikaryotic cultures of *U. avenae* in relation to their virulence on the test plants, it was necessary to devise a reliable method of inoculation with sporidia or mycelia. Dehulled oat seeds were laid with the embryo downwards on an agar culture at 20° C. After four days, when the embryo has attained a length of 1 to 2 cm. and an adequate root system is formed, the seed and a fragment of the culture are placed on soil in a clay dish, covered with pure sand, and again maintained at 20° until germination and subsequent transplanting. Up to 100 per cent. infection was secured on susceptible varieties by this method. The results of these tests confirmed previous observations as to the inability of monosporidial cultures to cause infection [ibid., xi, p. 37]. Marked differences in growth habit were shown by the haploid monosporidial cultures, indicating that a given

smut collection consists of a population of morphologically distinct, mostly heterozygotic biotypes [cf. ibid., viii, p. 298; x, p. 444]. Similarly it was shown that wide variations in pathogenicity characterize the biotypes of a given collection. By means of crosses between sporidia from spores of varying known pathogenicity it was ascertained that the inheritance of pathogenicity is dominant in respect to the Gopher variety, recessive with von Lochow, and mixed dominant and recessive with Lischow. Combinations were developed by segregation that failed to infect even the highly susceptible oat strain 01108. The mode of inheritance in *U. avenae* denotes that the selective action of different oat varieties is conditioned, not only by their specific resistance to the pathogen, but also by the transmission of virulence from one generation of the latter to the next. New physiologic forms may arise through the crossing of those already in existence, and in the interests of breeding for resistance the development of every possible new combination among the collections in Germany or neighbouring countries should be encouraged. It is not desirable, however, at any rate in the immediate future, to extend these attempts to forms from distant countries, the multiplication of which should be subject to stringent precautions. Seed-grain disinfection should immediately be applied at the first sign of disease in a hitherto immune stand.

M'Kay (R.). **The incidence and control of loose smut and leaf spot of Oats.**—*Journ. Dept. Agric. Irish Free State*, xxxii, 2, pp. 234–256, 1933. [Received April, 1934.]

An investigation into the seed-borne diseases of oats in the Irish Free State showed that the commonest smut is *Ustilago avenae* and the most prevalent and injurious disease the leaf spot due to *Helminthosporium avenae* [cf. *R.A.M.*, xiii, p. 89]; *U. kolleri* occurs occasionally, and the presence of halo blight (*Bacterium coronafaciens*) was established for the first time in circumstances which indicated that it had been introduced on seed from Germany.

In three localities *U. avenae* was completely controlled by seed disinfection with formalin spray (50 per cent., used at the rate of 1 qt. to 50 bushels of seed) or formalin sprinkle (1 in 320, 40 galls. to 50 bushels). It was ascertained that the chief factors reducing loose smut infection locally were very moist soil, the presence of hulls on the seed, and in some cases shallow sowing. In field tests ceresan and abavit B reduced the initial amount of infection by *H. avenae* to under 0·5 per cent., increased the number of plants per unit area by 22 to 25 per cent., and generally improved the vigour of the crop. Neither dust injured germination and both were superior to formalin for the control of leaf spot.

Dennis (R. W. G.). **Studies in the morphology and biology of Helminthosporium avenae.**—*Trans. Brit. Mycol. Soc.*, xviii, 3, pp. 223–238, 4 pl., 1 fig., 1 graph, 1933.

This is a somewhat condensed account of the author's studies of the leaf stripe disease of oats (*Helminthosporium avenae*) in

Scotland, a full report of which has already been noticed from another source [*R.A.M.*, xiii, p. 158].

Yu (T. F.). **Studies on Helminthosporium leaf spot of Maize.**—*Sinensia* (*Contr. Metrop. Mus. Nat. Hist. Acad. Sinica*), iii, 11, pp. 273–318, 4 pl., 1933.

A fully tabulated account is given of the writer's studies on the leaf spot of maize caused by *Ophiobolus heterostrophus* in its conidial stage *Helminthosporium maydis* [*R.A.M.*, x, p. 305], which was found in a two-year survey of the Nanking district of China on over 90 per cent. of the crop. The most conspicuous spots occur on the leaf blades, on which they are brown, fusiform, or elliptical, and 15·3 by 2·4 mm. in diameter. Wounded ears, leaf midribs, and stems may occasionally contract infection. *O. heterostrophus* can be grown on a number of standard media, but in these experiments perithecia (immature) were formed only on sterile maize and sorghum leaves at 27° to 33° C. The optimum temperature for conidial germination was found to lie between 26° and 32°. The conidia remain viable for a month on slides and for over a year on seeds in the laboratory; they also germinated after 16 months in agar tubes or 8 months on maize leaves. Both conidia and mycelium survive the winter when buried in soil in the open field. Wind and rain are the chief agencies in the dissemination of conidia in the field. Maize plants may be attacked at any stage of development. None of the other 35 Gramineae inoculated with *O. heterostrophus* proved susceptible.

Read (J. W.). **Destroying mold spores on bread by ultra-violet radiation.**—*Cereal Chem.*, xi, 1, pp. 80–85, 1934.

Freshly baked bread was heavily inoculated at the W. E. Long Company Research Laboratories, Chicago, with spores of common species of *Aspergillus*, *Penicillium*, *Rhizopus*, and *Mucor* [*R.A.M.*, xii, p. 757] and exposed for varying periods at given distances to ultra-violet radiation from three types of mercury vapour lamps and from the open C4 type of carbon lamp [cf. ibid., xi, p. 710]. After treatment the loaves were wrapped in sterile waxed paper and incubated at 93° to 95° F. Only one of the mercury vapour lamps proved to be effective against the moulds used in the tests, namely, the Uviarc with General Electric No. 10 burner, operated at 220 volts and 5 amperes, exposure to which for one minute at a distance of 6 in. generally caused the complete destruction of all the spores. For commercial purposes, however the 'C' carbon lamp, containing a mixture of iron, nickel, aluminium, and other materials in the core, is more advantageous, the lethal rays from this source destroying heavy spore infection in 45 seconds at a distance of 8 in., operating on direct current at 75 amperes and 60 volts. The rays were found to traverse the transparent sheeting (cellophane and 'sylphwrap') used for wrapping the loaves without diminution of fungicidal potency. This process of sterilization is now being successfully employed on a limited commercial scale to prevent the development of mould on certain special dietary products, such as 'Proteo' bread.

Narasimhan (M. J.) & Mayne (W. W.). **Report on the disease situation in Coffee areas in 1933.**—*Planters' Chron.*, xxviii, 26, pp. 585–590, 1933.

Observations made in 1933 failed to confirm the view [*R.A.M.*, xi, p. 368] that coffee die-back in southern India is a secondary condition following severe infection by leaf disease [*Hemileia vastatrix*] or, occasionally, other debilitating factors. Infection by *Colletotrichum* [*coffeanum*] and blackening of the shoot tissue occurred in shoots bearing a number of pairs of leaves, thus indicating that defoliation is not of prime importance as a predisposing cause. Further, in several localities no evidence could be obtained that infection by *H. vastatrix* was more severe during the period preceding the exceptionally severe outbreak of die-back in 1933 than it had been in other years. It is considered possible that in 1933 a parasitic strain of the *Colletotrichum* encountered highly favourable climatic conditions, with the result that it destroyed large numbers of young shoots.

In other years spray applications against *H. vastatrix* [ibid., xiii, p. 229] have reduced die-back to negligible proportions, but in the season under review the results were considerably less successful than usual, though in some districts the control was very satisfactory. The conclusion suggested by the data is that where poor control followed spraying it was due not to any failure in the protective power of the spray, but to a greater intensity of die-back in the period preceding spraying.

No evidence was forthcoming that die-back is caused by water-logging, many severely attacked areas being well drained while other, badly drained localities did not suffer more than the rest. No close correspondence was observed between soil or topographical features and die-back incidence, neither did observations on a number of estates indicate that the disease was associated with any particular shade tree.

The severity of the attacks experienced in 1933 is attributed to the early onset of 'blossom showers' and to continued showery weather up to the beginning of the south-west monsoon, which was early; similar climatic conditions were also associated with severe outbreaks in 1923 and 1928. The widely varying results given by spraying are attributed to the considerable development of die-back that occurred before spraying in some cases, and to the abundant production of unprotected growth after spraying in others. Excluding these conditions, the degree of control given by spraying was not clearly related to the time of application.

Stahel (G.). **De tegenwoordige stand van het onderzoek naar den overdrager der zeefvatenziekte van de Koffie.** [The present status of the investigation on the vector of phloem necrosis of Coffee.]—*Landbouwproefstat. Suriname Meded.* 7, 9 pp., 1934.

In connexion with the writer's researches on the insect vectors of the flagellates [*Phytomonas leptovasorum*] associated with phloem necrosis of coffee in Surinam [see above, p. 357], details are given of experiments indicating that *Lincus* bugs (*L.* (?) *securiger*)

may be concerned in the process of transmission. The food canal of these insects measures 4 μ in diameter and is thus amply wide enough to accommodate the largest coffee flagellates [ibid., xii, p. 435]. Bugs are known to transmit the latex flagellates of *Euphorbia* and *Asclepias* spp. [cf. ibid., vi, p. 437], and it seems probable that they serve a similar purpose in phloem necrosis of coffee. This line of investigation is being pursued.

Reports received from Experimental Stations, 1932–1933.— 234 pp., 2 figs., 22 graphs, 1 plan, London, Empire Cotton Growing Corporation, 1934.

This compilation of reports for the season 1932–3 received from various cotton-growing stations in the British Empire [cf. *R.A.M.*, xii, p. 438] contains, among others, the following items of phytopathological interest.

Investigation of the insect vectors of internal boll disease (*Nematospora gossypii* and *N. coryli*) in South Africa showed that *Dysdercus nigrofasciatus* appears before *D. fasciatus* or *D. intermedius*. By far the most important local wild hosts of these vectors are *Adansonia digitata* and two species of *Sterculia*. Evidence was obtained that, owing to the mechanical difficulty of obtaining food from bolls sufficiently advanced to provide proper nutrition, nymphs which have not reached the fourth instar are not efficient vectors of the disease. Early in the season staining is largely due to bacterial agency, but later on it is more definitely caused by *Nematospora*. Locally, *N. gossypii* is more abundant than *N. coryli*, and is transmitted by all three species of *Dysdercus*. Adults of *D. nigrofasciatus* collected from wild cotton and from *Hibiscus vitifolius* in November and December, as well as adults of *D. intermedius* collected from *S. rogersii* in the same months and from *Hibiscus* sp. in January, all carried *N. gossypii*; apparently, therefore, migrants to the crop are already infected with the fungus. Infection spreads more rapidly in bolls which have passed the stage of rapid growth and in which the lint is thickening than in young, rapidly growing bolls or older bolls beginning to mature and dry out. With neither fungus does the staining extend beyond the loculus where infection starts, and *Nematospora* is not present in the seed unless the latter has been directly punctured by the insects. *N. gossypii* and *N. coryli* vary considerably in virulence. In the early stages of infection by *N. coryli* the stained region approximates to that occupied by the fungus. The influence of *N. gossypii*, however, extends far beyond the region it occupies (limited to the immediate neighbourhood of the puncture) and causes extensive breakdown and matting of the lint. The spread of the staining beyond the region occupied by the fungus suggests that the death of the lint hairs is due to the liberation of a toxin, and bolls inoculated with a sterilized, centrifuged suspension of a pure culture of either fungus developed staining indistinguishable from that produced by the living organism, this effect being much more marked with *N. gossypii* than with *N. coryli*.

At Shambat (Sudan) X. 1530 (a selection from the Sakel main crop) and X.H. 1229 (a fixed hybrid between Sakel and Sea Island cotton) reached the final stage of propagation; in recent years

both have given a satisfactory yield and shown a high resistance to leaf curl, the latter being maintained in all the tests in 1932 [ibid., xii, p. 439]. The propagation of X. 1530 was continued on as large a scale as the available seed would allow, as it is intended to replace the Egyptian Sakel type with X. 1530 throughout the Gezira area; it is not, however, resistant to blackarm [*Bacterium malvacearum*].

In breeding tests in Uganda the best new selections were families of B. 31, the strain most resistant to blackarm; B. 37 and several U. 4 derivatives also gave satisfaction. The best pedigree line was a U. 4.4.2 derivative (B.P. 38/32), which gave a high yield and was very resistant to blackarm.

Experiments in St. Vincent showed that the red plant body of the perennial Peruvian type cotton, Trinidad Red Kidney, which is inherited by some of the progeny of this variety crossed with Sea Island Crinkled Dwarf and of these hybrids back-crossed to Sea Island, is correlated with apparent immunity from angular leaf spot [*Bact. malvacearum*: ibid., xi, p. 699], no infection having been noted on the strains of Sea Island type pure for red body for two years, though adjacent rows of other strains were attacked.

Vassilieff (A. A.). „Увядание" лубяных культур в условиях Средней Азии. ['Wilt' of cultivated bast-yielding plants under Central Asian conditions.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 22–24, Новлубинст. ВАСХНИЛ. [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

The results of experiments in 1932 in the neighbourhood of Namangan [Turkestan] to determine the host range of *Verticillium dahliae* (stated to be the cause of a serious wilt of cotton in Russian Central Asia) [cf. *R.A.M.*, xi, p. 41; xii, p. 470] showed that, when sown in plots which previously bore severely infected cotton plants, sesame [*Sesamum indicum*], okra [*Hibiscus esculentus*], soy-beans, hemp [*Cannabis sativa*], and American jute [*Abutilon avicennae*] were infected to the extent of 19·3, 85 to 93·5, 42·6, 24·2, and 98·2 to 100 per cent., respectively. The outward symptoms of the disease on these hosts were similar to those on cotton, but internally it was noticed that while in cotton the internal mycelium was strictly confined to the vascular bundles in the stem, from which it did not emerge (except at wounds involving the vessels) even when cut cotton stems were kept for a long time in a moist chamber, in okra and *A. avicennae* the mycelium often grew out through the walls and penetrated, both inter- and intra-cellularly, to the pith. In jute [*Corchorus capsularis*], which was also infected by the wilt, the mycelium passed from the vessels but did not extend beyond one or two cells.

Isolations from the wilted plants mostly yielded *V. dahliae*, which was culturally identical with the strain isolated from cotton; the latter was successfully inoculated into the other hosts through wounds.

A careful selection of rotation crops is evidently necessary in infected land. *V. dahliae* may well be also parasitic on a wide range of weeds.

Szilvinyi (A. v.). **Blastodendrion canis nov. sp.; ein Beitrag zur Diagnose und Systematik der asporogenen Sprosspilze.** [*Blastodendrion canis* nov. sp.; a contribution to the diagnosis and systematic grouping of the asporogenous budding fungi.] —*Zentralbl. für Bakt.*, Ab. 2, lxxxix, 13–16, pp. 284–299, 2 figs., 1933.

Based on the classification systems of Janke (Allgemeine technische Mikrobiologie. 1. Dresden und Leipzig (Steinkopf), 1924) and of Ciferri and Redaelli [*R.A.M.*, xiii, p. 186], the writer proposes a fresh grouping of the family Torulopsidaceae, revised in the light of recent studies and satisfying both botanical and medical requirements. Essentials for inclusion among the asporogenous budding fungi [a key to which is given] are the absence, not only of a perfect stage, but also of a true mycelium. The family is divided into two tribes, Torulopsideae with short sprouting cells and Mycotoruleae with long ones (pseudohyphae). To the former belong *Klöckera*, *Torulopsis*, and *Pityrosporum*, and to the latter *Mycotorula*, *Mycoderma*, *Pseudomycoderma*, *Pseudomonilia*, and *Blastodendrion*.

In this connexion details are given of an uncommonly variable representative of the last-mentioned genus, *B. canis* n. sp., which was isolated from a Chinese pet dog suffering from dermatitis whose owner was similarly affected. The organism [a Latin diagnosis of which is given] is characterized by round, elliptical, or occasionally rod-shaped cells, varying in size from 2·42 to 7·67 by 1·98 to 2·8 μ, according to the substratum, containing oil drops at maturity, forming white to yellowish, slightly raised colonies, with somewhat sinuous or rugose margins, and not fermenting sugars.

Lamb (J. H.) & Lamb (Margaret L.). **Precipitin and fermentation reactions of the Moniliae.**—*Proc. Soc. Exper. Biol. and Med.*, xxxi, 3, pp. 371–373, 1933.

On the basis both of their precipitin and fermentation reactions [which are briefly described], a number of Moniliae isolated from cases of bronchial asthma and ringworm of the feet fell into three groups, (I) comprising *Monilia* [*Candida*] *albicans*, *M.* [*C.*] *psilosis*, and *M. candida* [*C. vulgaris*: *R.A.M.*, xii, p. 692]; (II) represented by *M. parapsilosis* and Stovall's *M.* type 1 [ibid., xi, p. 373]; and (III) containing only *M.* [*C.*] *krusei*.

Kurotchkin (T. J.) & Lim (C. E.). **Experimental bronchomoniliasis in sensitized rabbits.**—*Proc. Soc. Exper. Biol. and Med.*, xxxi, 3, pp. 332–334, 1933.

It was experimentally shown that previous sensitization of rabbits with intravenous injections of heat-killed cultures of *Monilia* [*Candida*] *tropicalis* [*R.A.M.*, xi, p. 373] renders the animals susceptible to the subsequent intratracheal administration of the fungus. The lung infection is confined to the formation of multiple firm bodies containing caseous material, from which the fungus can be isolated. Old cultures rich in filamentous growth were shown to be somewhat more capable of producing lung lesions than young ones composed chiefly of budding cells.

Huang (P. T.). **Über einen Fall von dyshidrosiformer, oberflächlicher Hautaktinomykose der Handteller und Fusssohlen.** [On a case of dysidrosiform, superficial skin actinomycosis of the palms of the hands and soles of the feet.]—*Dermatol Wochenschr.*, xcvii, 48, pp. 1679–1685, 2 figs., 1933.

Clinical details are given of a case of actinomycosis in a 32-year-old woman at Sendai, Japan. The disturbance had spread from the left to the right hand and thence to the feet. The organism isolated from the lesions and grown on a number of standard nutrient media, is considered to be a species of *Actinomyces* related to *A. keratolytica* [*R.A.M.*, x, p. 456]. It is characterized by a well-developed mycelium with hyphae 0·5 μ or more in breadth, very long chains of spherical or elliptical arthrospores, 0·7 to 1 μ, and short, rod-shaped elements.

Ciarrocchi (L.). **Onico ed epidermomicosi da Epidermophyton rubrum (Castellani.)** [Onychosis and epidermomycosis due to *Epidermophyton rubrum* (Castellani).]—*Giorn. Ital. di Dermatol.*, lxxiv, 6, pp. 1535–1549, 3 pl. (1 col.), 1933.

A detailed account is given of a case of onychosis, which spread from the finger-nails to the forearm, neck, thighs, and knees, in a 53-year-old Italian mechanic. The causal agent was identified as *Trichophyton purpureum* (*Epidermophyton rubrum*) [*T. rubrum* or *Sabouraudites ruber*: *R.A.M.*, xi, p. 44; xiii, p. 303], characterized in hanging drop cultures on 2 per cent. maltose or glucose agar by hyphae 3 to 6 μ in diameter, piriform conidia 5 by 2·5 μ, abundant aleuria, and chlamydospores of variable shape. The organism proved to be non-toxic to guinea-pigs. This is stated to be the first record of *T. rubrum* in Italy.

Nicolaus (W.). **Ueber Histogenese und Altersbestimmung der durch Aspergillus fumigatus hervorgerufenen Veränderungen bei Hühnern.** [On histogenesis and determination of the age of the changes produced in fowls by *Aspergillus fumigatus*.]—*Zeitschr. für Infektionskrankh., &c. der Haustiere*, xlv, 2–3, pp. 191–209, 3 figs., 1933.

Aspergillosis was artificially induced in 8-months-old Leghorn hens by the intratracheal injection of a conidial emulsion of *Aspergillus fumigatus* [*R.A.M.*, xii, p. 372] in distilled water. The symptoms in the lungs and air sacs became apparent from eight hours after inoculation onwards. Conidial formation at first takes place entirely within the necrotic areas, then ceases and is ultimately resumed at a much later stage on the surface of the nodular lesions in the shape of a thick down. Three stages may be differentiated in the histological development of aspergillosis, namely, the subepithelial (up to 12 hours), the fructification phase (up to 3 days), and the period of capsule formation (from 3 days onwards).

Liese (W.). **Bakteriologische und biologische Versuche mit Benzoesäure und Benzoesäure-Derivaten.** [Bacteriological and biological experiments with benzoic acid and benzoic acid derivatives.]—*Arb. aus dem Reichsgesundheitsamte*, lxvi, 4, pp. 545–554, 1933.

In this paper (reprinted from *Arch. für Hygiene*, cx, pp. 355 *et*

seq., 1933) the writer, after describing his experiments on the efficacy of benzoic acid [*R.A.M.*, xii, p. 695] and its derivatives as food preservatives, calls attention to the possibility of the utilization of these compounds by food spoilage organisms as a source of carbon. *Penicillium glaucum* and *P. brevicaule* grew satisfactorily in a synthetic medium with the addition of 0·1 per cent. benzoic acid, over 0·2 per cent. sodium benzoate, 0·5 per cent. p-oxybenzoic acid, over 2 per cent. of the sodium salt of p-oxybenzoic acid, and 0·013 per cent. of the methyl, ethyl, and propyl esters. No growth was made, however, in the presence of the sodium salt of p-chlorbenzoic acid.

ZAPROMETOFF (N.). Список болезней новых лубяных культур Средней Азии. [List of diseases of new fibre plants in Central Asia.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 20–21, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

This is a very brief annotated list [arranged by the hosts] of the chief diseases and troubles recorded up to 1932 of the following newly introduced fibre-yielding plants in Russian Central Asia: kendir fibre (*Apocynum sibiricum*) [*A. venetum*], ambari hemp (*Hibiscus cannabinus*), American jute (*Abutilon avicennae*), okra (*H. esculentus*), sunn hemp (*Crotalaria juncea*), ramie (*Boehmeria nivea*), jute (*Corchorus capsularis*), and hemp (*Cannabis sativa*). [Most of the diseases listed are mentioned in the following abstracts.]

KHOKHRYAKOFF (M. K.). Новые виды грибных паразитов на новых лубяных растениях. [New species of parasitic fungi on the new fibre-yielding plants.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 61–67, 8 figs., Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Russian descriptions and Latin diagnoses are given of 15 species of parasitic fungi considered to be new to science which have been collected on the territory of the Russian Soviet Republics on species of *Abutilon*, kendir fibre (*Apocynum venetum*), ramie (*Boehmeria nivea*), jute (*Corchorus capsularis*), *Asclepias cornutus*, and ambari hemp (*Hibiscus cannabinus*). In addition to those of which a preliminary description has already been cited [*R.A.M.*, xii, p. 631] the following are included. *Stagonospora abutilonis* Chochr. on *Abutilon avicennae* leaves causes whitish spots with a narrow brown margin. The pycnidia are up to 130 μ in diameter, with a prominent ostiole, and contain 3- to 7-septate, straight or slightly curved, subhyaline (cinnamon in mass) pycnospores, 16 to 31 by 4 to 6 μ. *Septoria abutilonis* Chochr. on *A. divaricata* leaves forms cinnamon-grey to yellow spots up to 5 mm. in diameter, with an indistinct dark margin. The subglobose pycnidia are up to 140 μ in diameter and contain cylindrical, slightly curved, indistinctly septate pycnospores, narrowed at one end, and 45 to 77 by 3 to 4 μ. *Leptosphaeria apocyni* Bondarz. on *Apocynum venetum* stems forms white spots up to 10 mm. long, with erumpent perithecia up

to 180 μ in diameter, oblong-clavate to cylindrical asci, 60 to 65 by 9 to 11 μ, and 3- to 5-septate, fusiform, coloured ascospores, 21 to 27 by 4 to 5 μ. *Phoma apocyni* Bondarz. on the same substratum causes large chestnut spots with copious pycnidia up to 230 μ in diameter, containing cylindrical, hyaline pycnospores, 6 to 8 by 2·7 to 3 μ. On jute (*C. capsularis*) *Ascochyta corchoricola* Chochr. causes an irregular, whitish-grey leaf spot, 2 to 3 mm. in diameter and sometimes abscissed. The pycnidia are up to 125 μ in diameter and contain uniseptate, slightly constricted spores, 7 to 9·3 by 3 to 3·5 μ. *Leptosphaeria asclepiadis* Chochr. and *Clasterosporium asclepiadis* Tropova are also described from *Asclepias cornutus*.

Letoff (A. S.). Некоторые данные о болезнях новых лубяных культур в Дагестане (**1930** г.). [Some notes on diseases of new cultivated bast-yielding plants in Daghestan (1930).]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 37–43, 2 pl., Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Brief notes are given on the chief diseases of ambari hemp (*Hibiscus cannabinus*), American jute (*Abutilon avicennae*), kendir fibre (*Apocynum* spp.), and okra (*H. esculentus*) observed in Daghestan in 1930, among which the following may be mentioned. *H. cannabinus* exhibited a slight incidence (not over 3 per cent.) of a dwarf disease believed to be caused by a virus, as no organism could be isolated from diseased plants. The condition is characterized by a stunting of the whole plant, which never reaches more than one-fifth of the height of a normal one. The leaves are curled and crimped, and usually of a reddish or yellowish tinge, and the apical ones assume the form of a rosette. Affected plants rarely blossom and do not fruit. A species of *Pleosphaerulina* was observed on living leaves of the same host, and is provisionally referred to *P. suchumica* (Seim) Sacc., although it differs in some points from the original description of this species on okra, which is cited for comparison. This is stated to be the first record of this fungus on ambari hemp. Other fungi mentioned on this host include *Oidiopsis hibisci* and *Ascochyta hibisci-cannabini* [*R.A.M.*, xii, p. 632].

Gutner (L. S.). Новые болезни Конопли, Бамии и Испанского Дрока. [New diseases of Hemp, Okra, and Spanish Broom.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 71–72, 2 figs., Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Russian descriptions and Latin diagnoses are given of three species of parasitic fungi collected in Transcaucasia, which are considered to be new to science. *Pleosphaerulina cannabina* forms on the living leaves of hemp (*Cannabis sativa*) small, ochraceous, amphigenous spots, 2 to 4 mm. in diameter. The perithecia are globose, brownish, amphigenous, emergent, up to 125 μ in diameter. The asci are saccate, sessile, straight or bent, with a

thickened apex, 60 by 35 μ, without paraphyses, and contain eight oblong-ellipsoidal, muriform spores with 3 to 5 transverse septa, frequently sharply constricted in the middle, and measuring 30 by 12 to 15 μ. *Mycosphaerella hibisci* forms on living leaves of okra (*Hibiscus esculentus*) large, oblong, brownish spots, 1 to 4 cm. in diameter, frequently with a darker margin. The perithecia are epiphyllous, globose, light brown, up to 75 μ in diameter. The asci are clavate, sessile, 32 to 43 by 10 to 15 μ, with eight elliptical or spindle-shaped, distichous or subdistichous, two-celled, at first hyaline and later greenish spores, measuring 11 to 13 by 5·8 μ. *Colletotrichum spartii* forms on living stems of Spanish broom (*Spartium junceum*) numerous gregarious, at first subepidermal and later erumpent acervuli provided with setae, and up to 150 μ in diameter. The spores are subclavate, inequilateral, curved, and 12 to 16 by 3 to 6 μ in diameter.

Schmidt (V. V.). Болезни Кендыря и Кенафа. (Из отчета по работе на САНИС Новлубинститута в **1931** г.). [Diseases of Kendir Fibre and Ambari Hemp. (From the Report for 1931 of the SANIS Station of the Institute for New Fibres).]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 13–19, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Notes are given on the chief diseases of kendir fibre [*Apocynum venetum*] and ambari hemp [*Hibiscus cannabinus*] which were investigated in 1931 at the SANIS Station in Russian Central Asia. Of considerable economic importance is stated to be the root rot and wilt of kendir caused by an unidentified species of *Fusarium*. The disease is most severe in low-lying, moist soil, where from 50 to 70 per cent. of the seedlings may be destroyed. Older plants are much less susceptible, since while the incidence of the rot among transplants ranged from 1·7 to 9·7 per cent. in the first year it was less than 0·5 per cent. in two-year-old transplants. Observations indicated that varieties of *A. venetum* vary very considerably in their relative susceptibility to rust (*Melampsora apocyni*) [*R.A.M.*, xi, p. 182], those originating from regions with a damp climate (e.g. Kuban, in North Caucasus) showing a higher degree of resistance than the native varieties, which are severely injured; the highest susceptibility was exhibited by the Pictum variety. A small-scale experiment indicated that *M. apocyni* is controllable by heavy dusting with sulphur. Other diseases of this host that were investigated included stem spot (*Septoria apocyni*) [ibid., xii, p. 631], which was most severe on varieties originating from the valleys of the rivers Ili and Amu-Darya, chiefly attacked adult plants over five years old, and proved capable of considerably reducing the quality of the fibre. Observations showed that it first appears towards the end of June, when the plants are practically ready for harvesting, so that most of the damage may be averted by harvesting the crop as early as possible. As a rule diseased plants fail to set seed. Leaf spot (*S. littorea*) [ibid., x, p. 435] is also prevalent on certain varieties of kendir fibre, especially those with glabrous leaves.

The diseases of ambari of the greatest economic importance are bacteriosis of the leaves and stem tops, caused by unidentified species of *Bacterium*, sooty moulds, the powdery mildew *Leveillula* [*Oidiopsis*] *taurica* [*R.A.M.*, xi, p. 183; xii, p. 747], wilt (*Fusarium vasinfectum*), and root rot caused by an unidentified species of *Fusarium* and by *Moniliopsis aderholdi*.

Lantzova (Mme M. V.) & Tchernyak (S. L.). Работа по фитопатологии на Чуйской зональной станции Новлубинститута за лето **1932** г. [Phytopathological work at the River Chu Regional Station of the Institute for New Fibres during the summer of 1932.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 5–11, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

The kendir fibre plant [*Apocynum venetum*], a recent introduction in the Soviet Republic of Kirghizia [basin of the river Chu, formerly Akmolinsk], is stated to be extensively and severely attacked there by rust (*Melampsora apocyni*), stem spot (*Septoria apocyni*), and melanose (*Septoria littorea*) [see preceding abstract]. Experiments in 1932 on the control of rust by dusting with sulphur or spraying with 1 per cent. Bordeaux mixture gave negative results, presumably because the treatments were applied when the rust was already well established. The detrimental action of the rust on the host was shown by the fact that severely infected plants on the average yielded 31 gm. air-dried bast and 25·9 gm. fibre, as against 66·5 and 32·5 gm., respectively, obtained from slightly affected plants (no entirely disease-free plants could be found to serve as control); the average length of the fibre was reduced from 13·4 in the latter to 12·3 [? cm.] in the former. In the upper reaches of the river Chu kendir fibre was also fairly severely attacked by a wilt associated with a root rot, an unidentified species of *Fusarium* developing from affected tissues placed in a moist chamber. This disease was not seen lower down the river.

Hemp [*Cannabis sativa*], stated to be very widely cultivated in this region, is apparently immune from fungal diseases locally.

Bakhtin (V. S.) & Gutner (L. S.). Новое заболевание Конопли. [A new disease of Hemp.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 68–70, 1 fig., Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

A brief account is given of a leaf spot which was observed in 1931 in experimental plots of hemp (*Cannabis sativa*) in the neighbourhood of Leningrad, and which was especially prevalent on varieties originating from France and Japan. The causal organism is a species of *Macrosporium* close to *M. sarcinaeforme* on clover [*R.A.M.*, xi, p. 377], but differing from it sufficiently to be considered a new species which is named *M. cannabinum*, a Latin diagnosis being appended. The spots are numerous, rounded or sinuous, concentrically zoned, greyish-green or brownish, with a darker margin, 3 to 10 mm. in diameter, and frequently

coalescing. The conidiophores are subhyaline, torulose, septate, and 75 to 120 by 6 to 7·5 μ. The conidia are ellipsoidal or rounded, blackish-olive, muriform, with three to six transverse and two to four longitudinal septa, minutely warted, constricted at the septa, without a pedicel, and measure 30 to 45 by 15 to 22 μ.

Schwarzmann (S. R.). Болезни Кенафа и Канатника по данным наблюдения **1930** г. на Северном Кавказе. [Diseases of Ambari Hemp and American Jute according to observations in North Caucasus in 1930.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 44–50, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

The author gives brief notes on the symptoms and relative importance of the main diseases of ambari hemp [*Hibiscus cannabinus*] and American jute [*Abutilon avicennae*] which were observed in North Caucasus in 1930. Only the generic names of the fungi concerned are given.

Lissitzyna (Mme M. I.). Осенние наблюдения над болезнями новых лубяных культур в условиях Дагестана. [Autumn observations on the diseases of new cultivated bast-yielding plants under Daghestan conditions.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 29–36, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Ambari hemp [*Hibiscus cannabinus*] was severely attacked by *Botrytis* [*cinerea*: see next abstract] in 1931 on the Borozdinsky Farm in Daghestan. The fungus was first observed at the beginning of August on the stems, on which it formed dark, water-soaked spots, under which the cortical tissues rotted and eventually peeled off, leaving bare the bast in a badly macerated condition. The infection rapidly extended, until by the middle of October from 50 to 65 per cent. of the plants were diseased, many of the stems breaking at the points of infection. The disease was particularly prevalent and severe on freshly broken land, on which the stands were most vigorous and dense. The fungus also attacked the leaves and the immature seed capsules, reducing the production of seed though the latter was not infected. The fungus appears to gain entry into the host tissues chiefly through insect injuries. It continued to exist saprophytically on the cut ambari hemp, on which, however, it was more superficial and did not affect the quality of the fibre as heavily as in the attack on the growing plant.

Another widespread disease of ambari hemp, for which the descriptive name 'grey bast' is suggested, was caused by an unidentified species of *Fusarium*, of the section *discolor*. The disease first appears on the roots, in the form of dark brown spots; later the whole root darkens and the cortex rots. From the roots the fungus spreads into the stems, all the tissues of which are permeated by a dense mycelium, on which innumerable intercalary chlamydospores are formed in clumps. The bluish- (occasionally greenish-) grey colour of badly decomposed bast is caused by the

accumulation of the chlamydospores which form between it and the xylem. Infected roots incubated at a temperature of 25° to 28° C. developed an abundant white aerial mycelium with five- (rarely three- or four-) septate, slightly curved macroconidia measuring 21 to 37·5 by 3·7 μ, and microconidia 8·5 to 13 by 2·9 to 3·8 μ. This disease, as well as two others of the same host, associated with two different species of *Fusarium*, are being further investigated. A species of *Alternaria* [referred to *Macrosporium hibiscinum* Thüm. in an editorial footnote] caused a leaf spotting of minor economic importance on ambari hemp.

American jute [*Abutilon avicennae*] suffered chiefly from two different stem spots, one associated with an unnamed *Fusarium* [the microscopic characters of which are briefly described], and the other with a sterile fungus not yet identified.

Notes are also given on kendir fibre rust (*Melampsora apocyni*) [see above, p. 375].

Nazarova (Mme E. S.). Весенние наблюдения над болезнями новых лубяных культур в условиях Дагестана. [Spring observations on the diseases of new cultivated bast-yielding plants under Daghestan conditions.]—*ex* Болезни и вредители новых лубяных культур [Diseases and pests of new cultivated textile plants], pp. 25–28, Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

Observations in the early spring of 1932 at the Borozdinsky Farm in Daghestan showed that sheaves and stacks of ambari hemp [*Hibiscus cannabinus*] left over winter in the field suffered very severely from attacks of *Botrytis cinerea* [see preceding abstract] which, in the form of sclerotia, remained viable throughout the winter and produced abundant conidia at the beginning of April. The fungus was also found thriving on the stubble from the preceding crop, and was readily isolated from the superficial layers of soil in the infected fields. It was also present in two-year-old stacks and sheaves, but its growth was considerably masked and suppressed by various black moulds that injure the fibre as much as *B. cinerea*. These moulds also attack stacked American jute [*Abutilon avicennae*] and hemp [*Cannabis sativa*], from which *B. cinerea* was not isolated, although the appearance of the stacks and sheaves of these two plants gave reasons to suspect its presence. Some stem spotting, injurious to the fibre, also occurred on ambari, associated with a species of *Rhabdospora*, and on hemp, associated with a *Dendrophoma*. In sheaves *H. cannabinus* was also heavily attacked by a species of *Fusarium* which formed fairly large (up to 1·5 mm.) pink sporodochia on the stems, and imparted a pink discoloration to the fibre. This fungus was found twice on American jute and once on hemp.

In a neighbouring farm, kendir fibre [*Apocynum venetum*] was fairly severely attacked by *Septoria littorea* and *S. apocyni* [see above, p. 375].

Tropova (Mme A. T.). К материалам по болезням Канатника. [A contribution to the diseases of American Jute.]—*ex* Болезни и вредители новых лубяных культур [Diseases and

pests of new cultivated textile plants], pp. 58–60, 3 figs., 1 pl. (at the end of volume), Новлубинст. ВАСХНИЛ [Inst. New Bast Raw Material VASKhNIL], Moscow, 1933.

American jute (*Abutilon avicennae*) plants growing near tobacco plantations in North Caucasus in 1930 developed a condition closely resembling reticulate mosaic of tobacco, and characterized by a darker green colour than normal of some portions of the leaf blade, with a vein-clearing effect. Experiments are in progress to determine the nature of the trouble and whether it is transmissible from tobacco to *A. avicennae*. In North Caucasus and the Don region, the latter host is also attacked by a species of *Clasterosporium* which is regarded as a new species and named *C. abutilonis* [with a Latin diagnosis]. The fungus forms on the leaves dark brown, confluent spots up to 0·5 cm. in diameter, which may invade the whole blade and cause defoliation. The conidia are oblong-ellipsoidal, light brown, with up to 9 transverse septa, and 116 to 120 by 23 to 24 μ in diameter. In the Russian Far East, Ukraine, and North Caucasus, American jute is occasionally attacked by *Ascochyta abutilonis* Hollós, which forms white spots on the stems, destroying the cortical tissues but leaving the bast fibres intact. This suggests the possibility of using this fungus for the rapid retting of American jute stems without immersion in water.

Luz (G.). **Ueber ein neues Verticilliumvorkommen.** [On a new occurrence of *Verticillium.*]—*Ber. Schweiz. Bot. Gesellsch.*, xlii, 2, pp. 754–761, 1 fig., 2 graphs, 1933. [Received April, 1934.]

From a damaged wallpaper examined at the Zürich Technical Institute the writer isolated a fungus characterized by hyaline, septate hyphae, septate, erect, often brownish, lateral conidiophores, with verticillate lateral branches, 100 μ in length and 3·5 μ in thickness, bearing yellowish-brown, elliptical or bean-shaped conidia, 2·8 to 12 (mostly 4·9) by 2·3 to 3 μ. The organism was identified as *Verticillium cinnabarinum* [*R.A.M.*, vii, p. 471], though differing in certain particulars from the culture determined as the species of Reinke and Berthold at the Centraalbureau voor Schimmelcultures, Baarn. Thus, the Swiss form sporulates more profusely than the latter, the conidial length of which ranges from 2·8 to 8·8 μ, with the greatest number at 4·4 μ. The optimum temperature for the growth of both forms was found to be 21° C., but the Swiss one developed slightly better than the original at 27°. The fungus had utilized the cellulose in the wallpaper to such an extent that the fibres were destroyed. After a few months in artificial culture on malt agar the capacity to assimilate cellulose was entirely lost.

Blattny (C.). **Virové choroby Pelargonií.** [Virus diseases of Pelargoniums.]—*Ochrana Rostlin*, xiii, 3–4, p. 145, 1933.

The author draws attention to the existence in Czecho-Slovakia of at least two virus diseases of pelargoniums, in addition to leaf curl [*R.A.M.*, xii, p. 223], namely, aucuba mosaic which apparently does not affect the growth of the host, and an interveinal chlorosis,

characterized in young plants by a pale green discoloration of the leaf areas between the veins which are of a deep green; in older leaves the only symptom is a darker coloration than normal of the leaf margins, while in mature leaves the disease is marked by an irregular and diffuse dispersion of the normal green colour and by a smaller size of the leaves than normal. This condition was transmitted to healthy plants by grafting.

Drechsler (C.). **Vascular wilt and root rot of Pansies due to Aphanomyces sp.**—Abs. in *Phytopath.*, xxiv, 1, pp. 7–8, 1934.

Late in April, 1933, pansies [*Viola tricolor*] in the same beds that they had occupied for several consecutive years developed symptoms of wilt, which became progressively more severe. The vascular cylinder showed a deep orange-reddish discoloration, and by the middle of May the stem bases and roots were extensively rotted and the aerial organs collapsed and shrivelled. Numerous oospores of a species of *Aphanomyces* were observed surrounding the discoloured vascular cylinders in the early stages of infection; the fungus was found to differ morphologically from *A. euteiches* on peas and did not altogether agree with the Dutch form of the latter, P.F.2 [*R.A.M.*, viii, p. 187].

Hansen (H. N.) & Scott (C. E.). **A canker and gall disease of Gardenia.**—*Science*, N.S., lxxix, 2036, p. 18, 1934.

A species of *Phomopsis* with hyaline, unicellular, elliptic-fusiform A spores measuring 9·7 by 3·4 μ and hyaline, unicellular, filiform, curved or flexuous B spores, 22·2 by 1·4 μ, was readily isolated in pure culture from several greenhouse gardenia varieties affected by a canker and gall disease in California. Infection appears to occur exclusively through wounds, mostly near the soil. Oblong cankers, frequently with a corrugated surface, develop on branches and stems at a distance from the soil. On infected crowns the cankers, originally of the foregoing type, soon become overgrown with hypertrophied cortical tissue involving the entire circumference of the stem, increasing its diameter to twice the normal or more, and extending longitudinally in both directions from the site of infection for one or two inches, giving the effect of an oblong gall. In both cankers and galls the cortex is coloured bright yellow for some distance ahead of the invading fungus.

Pape (H.). **Die Mosaikkrankheit der Lilien.** [The mosaic disease of Lilies.]—*Gartenwelt*, xxxvii, pp. 324–325, 364, 4 figs., 1933. [Abs. in *Zentralbl. für Bakt.*, Ab. 2, lxxxix, 17–20, pp. 431–432, 1934.]

Lily mosaic [*R.A.M.*, xiii, p. 165] is characterized by a pale green mottling of the foliage, often accompanied by distortion, desiccation, and a brown discoloration, the flowers being frequently malformed and the whole plant stunted. The virus is stated to be transmitted by *Aphis gossypii* [ibid., x, p. 247]. At temperatures below 22° C. and in shady, cool sites the foliar irregularities are more pronounced than under warmer conditions. In a Schleswig-Holstein nursery-garden *Lilium longiflorum* var. *formosanum* was the only variety

affected, *L. longiflorum* var. *erabu*, *L. auratum*, and others remaining healthy.

BRIERLEY (P.) & MCWHORTER (F. P.). **A mosaic disease of bulbous Iris.**—Abs. in *Phytopath.*, xxiv, 1, p. 4, 1934.

A destructive mosaic disease of bulbous irises [*R.A.M.*, xi, pp. 430, 796, 797] is stated to have been introduced into the United States on stocks of European origin. The diseased plants are dwarfed, with yellow-striped or mottled leaves and blotched flowers. From 1929 to 1933, 41 per cent. infection was obtained by tissue-grafting experiments, 12 per cent. by nodal injections with hypodermic needles, and 56 per cent. by internodal pith injections. Natural transmission appears to be due to aphids, *Myzus persicae* and *Illinoia solanifolia* [*Macrosiphum gei*] giving 100 per cent. infection in four trials on 50 plants, and 31 per cent. in 14 trials on 122 plants, respectively.

MAINS (E. B.). **Host specialization in the rust of Iris, Puccinia iridis.**—*Amer. Journ. of Botany*, xxi, 1, pp. 23–33, 4 figs., 1934.

The results of an examination of numerous species and varieties of *Iris* naturally infected and artificially inoculated with *Puccinia iridis* [*R.A.M.*, ix, p. 38] proved the existence of at least two biologic forms, namely, sp. f. *australis*, occurring with particular virulence on *I. fulva* and *I. foliosa*, and sp. f. *septentrionalis*, to which the foregoing and a number of well-known horticultural varieties are markedly resistant while others, including *Hermodactylus tuberosus* (also sometimes known as *I. tuberosa*) are susceptible. The probable existence of several other biologic forms is suggested by the resistance to the forms under observation of certain species and groups reported elsewhere as susceptible.

RIEFENSTAHL (S.). **Wachsende Verluste durch die Hartfäulekrankheit der Gladiolen.** [Growing losses from the hard rot disease of Gladioli.]—*Gartenwelt*, xxxvii, p. 314, 1933. [Abs. in *Zentralbl. für Bakt.*, Ab. 2, lxxxix, 17–20, p. 428, 1934.]

The damp summer weather prevailing during recent years in Germany is stated to have favoured outbreaks of hard rot (*Septoria gladioli*) [*R.A.M.*, xi, p. 24 *et passim*] among gladiolus stands, the incidence of infection ranging from between 10 and 20 per cent. in the America variety to 90 per cent. in War. Within the Primulinus group only Scarletta is susceptible. In addition to regular change of site and the use of healthy planting material, the immersion of the corms for 1½ to 2½ hours in 0·15 to 0·20 per cent. uspulun is recommended.

GHAMRAWY (A. K.). **Rotting of Galtonia bulbs caused by Fusarium culmorum (W. G. Sm.) Sacc. and Penicillium corymbiferum Westling.**—*Trans. Brit. Mycol. Soc.*, xviii, 3, pp. 249–252, 1 graph, 1933.

A brief account is given of pathogenicity tests of a strain each of *Fusarium culmorum* and *Penicillium corymbiferum* [cf. *R.A.M.*, xi, p. 460] which were isolated from rotting Cape hyacinth

(*Galtonia candicans*) bulbs of Dutch origin, stored in a Covent Garden warehouse. The results showed that both strains actively attack the bulbs under a variety of storage conditions, *F. culmorum* being the more active parasite at temperatures of about 28° C. Further experiments showed that *P. corymbiferum* and a similar form isolated from lily were alone able to cause rotting of *G. candicans* bulbs planted in soil in the open, and then only when inoculated through wounds.

KEUR (J. Y.). **Partial recovery and immunity of virus-diseased Abutilon.**—Abs. in *Phytopath.*, xxiv, 1, pp. 12–13, 1934.

Abutilon plants sometimes recover partially from the effects of the virus of infectious variegation [*R.A.M.*, xii, p. 375], green-leaved branches developing on mottled diseased plants. Baur [cf. ibid., viii, p. 662] claimed that such branches on *A. thompsoni* were immune. The following results were obtained with green branches of five variegated species of *Abutilon*. The virus is absent from such branches, as shown by the failure of scions from them to infect susceptible green clones. The virus does not traverse the green branches in sufficient amounts to produce variegated symptoms in susceptible green scions grafted on the green branches. The latter, however, are not actually immune, green clones propapated from them being liable to reinfection, not only by scions of other variegated *Abutilon* clones, but also by those of their own variegated clones.

SILOW (R. A.). **A systemic disease of Red Clover caused by Botrytis anthophila Bond.**—*Trans. Brit. Mycol. Soc.*, xviii, 3, pp. 239–248, 1 pl., 1 fig., 1 graph, 1933.

This is a brief report of the author's studies of *Botrytis anthophila* [*R.A.M.*, vi, p. 98] on red clover [*Trifolium pratense*] at the Welsh Plant Breeding Station, Aberystwyth, which in its morphological and cultural characters agreed well with Bondartzeff's description. It was shown that the ash-grey discoloration of the diseased anthers is due to the development of conidiophores and spores of the fungus, which often envelop both anthers and stigma. The mycelium ramifies among the pollen grains, the conidiophores breaking through the anther walls. It was experimentally shown that bees play an important part in the dissemination of the disease by carrying the spores from infected to healthy flowers. After having reached the stigmas, the spores germinate by producing very fine hyphae which rapidly traverse the stylar canal, and after some days increase in diameter to about 3 or 4 μ. Infection of healthy red clover flowers was also secured by cross-pollination with pollen either naturally or artificially contaminated with spores. The infection becomes systemic in plants grown from internally infected seed, and hyphae of the parasite can be detected in the intercellular spaces of the pith, rarely forming haustoria in the pith cells, as well as in the tissues at the base of the corolla and filament tube. There was evidence that the fungus considerably reduces the fertility of the male plants, and also the yield in seed of female plants. Field observations in 1930 showed that the

disease was widely distributed in red clovers of various origins, especially on the late-flowering varieties.

B. antherarum trifolii Schlecht is regarded as synonymous with *B. anthophila*, and it is believed that *B. trifolii* [ibid., vi, p. 489] is probably a variety of this species, differing perhaps slightly in the size of conidia and in certain cultural characteristics.

Klinkowski (M.) & Richter (H.). **Der Stengelbrenner (Anthraknose) der Luzerne, verursacht durch den Pilz Colletotrichum trifolii.** [Stem scorch (anthracnose) of Lucerne caused by the fungus *Colletotrichum trifolii*.]—*Nachrichtenbl. Deutsch. Pflanzenschutzdienst*, xiv, 1, pp. 1–3, 3 figs., 1934.

Lucerne in the experimental field of the Biological Institute, Berlin-Dahlem, was attacked in August, 1933, by *Colletotrichum trifolii* [*R.A.M.*, xiii, p. 168], not hitherto recorded in Europe. The symptoms of the anthracnose disease are briefly described in popular terms, and attention is drawn to the risk of confusion between *C. trifolii* and *Gloeosporium caulivorum* [*Kabatiella caulivora*], a common parasite of red clover (*Trifolium pratense*) in Europe [ibid., xi, p. 768], from which lucerne, however, appears to be immune [ibid., vi, p. 100].

Appel (O.). **Gräserkrankheiten.** [Grass diseases.]—*Deutsche Landw. Presse*, lx, 51, p. 641, 1 col. pl., 1933.

A popular note is given on the following well-known diseases of grasses in Germany: ergot (*Claviceps purpurea*) and *Fusarium* on *Lolium perenne* [*R.A.M.*, xi, p. 364]; *Sclerotium rhizodes* [ibid., xii, p. 450] on *Phalaris arundinacea*; and *Epichloe typhina* [ibid., xiii, p. 169] on *Festuca rubra* and other meadow grasses.

Nattrass (R. M.). **A new species of Hendersonula (H. toruloidea) on deciduous trees in Egypt.**—*Trans. Brit. Mycol. Soc.*, xviii, 3, pp. 189–198, 2 pl., 5 figs., 1933.

Stone fruit trees, and to a lesser degree the apple, are stated to be widely affected throughout Egypt by a serious form of gummosis and die-back, the first outward symptom of which in mature trees is a wilting and die-back of twigs and branches, with a copious exudation of a gum-like substance. The trouble may either gradually spread to the whole tree which may survive one or two seasons, or trees in their prime and in full bearing may suddenly wilt and die within a short time. While observations indicate that the disease is primarily due to unsuitable soil conditions and waterlogging, isolations from affected tissues almost invariably yielded a pure culture of a *Torula* form which, on sterilized blocks of cotton and willow twigs, produced black or grey, spongy stromata, in which in from one to four months black, carbonaceous pycnidia developed. Similar structures were found during the summer of 1930 in nature on branches of apricot trees in Maadi, Cairo. These stromata, which originated in the cortex, varied considerably in shape and size (up to 1·5 by 0·5 mm.); they were either immersed or erumpent, and contained one or more locular, immersed, or protuberant pycnidia which also greatly varied in size and shape, ranging from spherical to cuneiform, oval, or vertically elongated.

The sporophores are hyaline, terete, continuous, and 8 to 10 μ in length. The pycnospores are oblong or oval, at first hyaline and continuous, later frequently two-septate, with a dark central cell, and 12 to 13·5 (exceptionally 17) by 4 to 5·5 μ. Paraphyses were not observed. Monospore cultures from these spores again produced the *Torula* form, identical with that of the original isolations. The fungus is considered to be new to science and is named *Hendersonula toruloidea*, a Latin diagnosis of which is appended.

Crowell (I. H.). **Fungicidal control of Gymnosporangium juniperi-virginianae and related species.**—Abs. in *Phytopath.*, xxiv, 1, pp. 5–6, 1934.

Of the numerous fungicides tested in three years' experiment at the Arnold Arboretum of Harvard University against *Gymnosporangium juniperi-virginianae* and other species on red cedars [*Juniperus virginiana*] and various susceptible Pomaceae [*R.A.M.*, xiii, p. 311 and next abstract], a special form of pure colloidal sulphur from a Boston chemical firm was the only one to confer complete protection on the aecidial hosts. Tests in the direct treatment of the red cedars, the eradication of which to save the alternate pomaceous hosts might thus be obviated, are in progress with some promising materials.

Crowell (I. H.). **Relative susceptibility of the species of Malus to Gymnosporangium juniperi-virginianae.**—Abs. in *Phytopath.*, xxiv, 1, p. 6, 1934.

Most of the known species of *Malus* [*Pyrus*] have been tested at the Arnold Arboretum for their reaction to *Gymnosporangium juniperi-virginianae* [see preceding abstract], with results ranging from high susceptibility to complete immunity. All the species of the section *Chloromeles*, which are native to eastern North America, were found to be susceptible. Evidence of biologic specialization was obtained in inoculation tests with collections of the fungus from eight States.

Palmiter (D. H.). **Variability in monoconidial cultures of Venturia inaequalis.**—*Phytopath.*, xxiv, 1, pp. 22–47, 2 figs., 1 graph, 1934.

This is an expanded account of the writer's studies on the variations in monoconidial cultures of *Venturia inaequalis*, isolated from 14 apple varieties in Wisconsin, Oregon, Michigan, and New York, a note on which has already appeared [*R.A.M.*, xi, p. 461]. All the cultures grew best at 20° C. between P_H 4·8 and 5·8, but there were marked differences between the individual strains in their rate of development at these optima. Some of the cultures produced sectors differing from the parents in general appearance, spore production, and growth rate. Of 13 species of *Malus* [*Pyrus*] inoculated with six cultures of *V. inaequalis*, nine were infected by one or more and one (*P. niedzwetzkyana*) by all; neither *P. floribunda* nor *P. angustifolia* proved susceptible in these tests. These results are considered to indicate that the apple scab organism is a complex of numerous strains varying in their morphotogical and physiological characters.

ROBERTS (J. W.). **Apple target canker, measles, and rough bark.** —Abs. in *Phytopath.*, xxiv, 1, p. 16, 1934.

A bacterium, probably *Pseudomonas papulans* [*R.A.M.*, x, p. 604], has been isolated from the papulate early stage of apple target canker and rough bark in the Delicious and Yellow Newtown varieties, respectively. Measles, target canker, and rough bark may prove to be forms of an identical disease, the early stages of which are similar and apparently all associated with the same organism. The apple diseases observed by Miss Lacey and Dowson in England [ibid., x, p. 603] and by Hopkins [the 'Elgin' disease: ibid., vii, p. 328] in South Africa may also be of related origin.

COOLEY (J. S.). **Winter injury and drought in relation to Apple root rot (Xylaria mali).**—Abs. in *Phytopath.*, xxiv, 1, p. 5, 1934.

Black root rot of apple (*Xylaria mali*) [*R.A.M.*, xi, p. 284] is stated to be much more prevalent on the lower slopes of badly drained hillsides in Virginia and other eastern States than on higher and better drained areas where winter injury is less prominent. Drought appears to be another important contributory factor in the causation of this type of root rot.

WIESMANN (R.). **Der Spät- oder Kahlschorf der Birnblätter und seine Bedeutung für die Ueberwinterung des Birnschorfpilzes.** [The belated or sterile scab of Pear leaves and its significance in the overwintering of the Pear scab fungus.]—*Schweiz. Zeitschr. für Obst- und Weinbau*, xlii, 2, pp. 18–23, 4 figs., 1933. [Abs. in *Exper. Stat. Record*, lxx, 1, p. 58, 1934.]

A practically sterile type of pear scab (*Venturia pirina*) is described, which occurs in Switzerland in the autumn on the leaves even of comparatively resistant varieties, causing premature defoliation and preventing the development of autumnal coloration. This form of scab was found to be without importance in the overwintering of the fungus, which produces no perithecia in the affected foliage. Scab outbreaks of this nature frequently occur in epidemic form towards the end of the season.

CIFERRI (R.). **Esperienze ed osservazioni sulla 'clorosi', sulla 'rosetta' e sul 'mal del piombo' nutrizionali del Pesco.** [Experiments and observations on nutritional 'chlorosis', 'rosette', and 'silver leaf disease' of Peach.]—*Boll. R. Staz. Pat. Veg.*, N.S., xiii, 4, pp. 432–536, 8 pl., 11 figs., 1933. [English summary.]

In this paper the author gives a detailed account of preliminary investigations conducted in 1932–3 into three non-parasitic diseases due to nutritional disturbances which are seriously threatening the recently established peach-growing industry in the vicinity of Alba, Piedmont, viz., chlorosis [*R.A.M.*, ix, p. 43; xii, p. 373], rosette [ibid., viii, p. 111], and the physiological form of silver leaf [ibid., vii, p. 557 and next abstract], the points mainly dealt with in each case being the local intensity, topographical distribution, and varietal susceptibility. The causes of the conditions under

the local prevailing conditions are discussed and suggestions made for their control.

A bibliography of 37 titles is appended.

CURZI (M.). **Il mal del piombo da necrosi e carie del legno in Italia.** [Silver leaf disease due to necrosis and decay of the wood in Italy.]—*Boll. R. Staz. Pat. Veg.*, N.S., xiii, 4, pp. 566–590, 1 pl., 3 figs., 1933. [English summary.]

After referring to previous investigations into silver leaf disease of peaches and plums and pointing out that although in many countries the condition is due to *Stereum purpureum* [*R.A.M.*, xii, pp. 36, 142], in others, including France and Italy, a non-parasitic form with similar symptoms is present [see preceding abstract], the author distinguishes between three main types of silver leaf, viz., that accompanied by necrosis and decay of the wood and associated with fungal attack, that characterized by the formation of calcium oxalate crystals in the leaves [ibid., iii, p. 46], and that due to meteorological conditions.

The first type (several cases of which are described) is the commonest and most serious form of silver leaf on peach and plum in Italy, though owing to the absence of fruiting bodies on the affected trees only scattered infections occur in any one orchard. From diseased branches the author isolated strains of a Basidiomycete varying slightly with the locality but not substantially different from *S. purpureum*; studies of the parasitism of this fungus are in progress.

Notes are given on the factors favouring the development and spread of this form of the disease, and there is a bibliography of 38 titles.

SCHWARZ (O.). **Beiträge zur Pathologie der Feige, Ficus carica L. I. Das Fruchtfäuleproblem in Kleinasien.** [Contributions to the pathology of the Fig, *Ficus carica* L. I. The fruit rot problem in Asia Minor.]—*Phytopath. Zeitschr.*, vi, 6, pp. 589–618, 1 graph, 1 map, 1933.

The writer has made a comprehensive study of fig spoilage in Turkey, where the heaviest damage was found to occur in the mountain valleys of Selçuk and the plain of Sokia, though an incidence of 10 to 15 per cent. was observed elsewhere, especially near Bayindir. The following types of injury are differentiated and described: wet rot, roughly corresponding to the American 'souring' [*R.A.M.*, x, p. 679], black rot ('smut') chiefly due to *Aspergillus niger* [ibid., xiii, p. 42], mouldy rot and grey rot ('mould'), and brown rot (with certain stages of the mouldy and grey rots) equivalent to 'endosepsis' [ibid., viii, p. 584] and associated largely with *A. ochraceus* and species of *Fusarium*. A list is given of 19 fungi and bacteria found associated with the rotting of figs, of which seven, namely, *Alternaria tenuis, Aspergillus niger*, *A. ochraceus, Fusarium* sp. allied to *F. heterosporum* [ibid., xi, p. 399], *F. moniliforme* [*Gibberella moniliformis*], and *Sarcina* sp., infected the fruit after caprification. In 27 figs from Selçuk *G. moniliformis* was responsible for the highest incidence of infection, occurring on 16 or 59·2 per cent. in the form of 'mouldy', 'brown',

or 'grey' rots [cf. ibid., viii, p. 257]. It appears unlikely, from an examination of the fungus flora of the so-called 'gall figs', i.e., those serving as a breeding-ground for the fig gall wasp, *Blastophaga psenes*, that the fungous spores are transmitted directly from these fruits to the caprifigs, only those of *A. niger* being in the least adapted to insect transmission. It is considered more probable that infection takes place during the ripening period when the 'eye' opens. During the height of summer the Turkish valleys are visited by quasi-cyclonic dust storms which aid the dissemination of the spores. It was shown by experiments [details of which are given] that the presence even of the typical rot fungi in ripening figs does not necessarily lead to decay. There is evidently some inherent predisposition in the figs themselves which governs their reaction to the invading fungi.

JENKINS (A. E.). **A species of Sphaceloma on Avocado.**—*Phytopath.*, xxiv, 1, pp. 84–85, 1934.

The species of *Sphaceloma* responsible for avocado (*Persea americana*) [*P. gratissima*] scab in Florida, Cuba, Porto Rico, Mexico, Peru, Rhodesia, and South Africa [*R.A.M.*, v, p. 310] is described technically as *S. perseae* n. sp., with a Latin diagnosis. Specimens from Peru and Rhodesia were not seen, the records being taken from the literature.

The lesions produced by the fungus are brown to almost black and up to 3 mm. in diameter. The acervuli develop into scattered to effuse sporodochia, dark or pale brownish-olive in the mass, and from 25 to about 70 μ in length. The conidiophores, uni- to bicellular at first, often about 12 μ in height by 2 to 7 μ at the base, tapering or acute to truncate at the apex, arise from hyaline, intraepidermal hyphae or a prosenchymatous stroma; on rupturing the epidermis they increase in length either by continued growth or by conidia remaining *in situ* and developing as part of the conidiophore, a length of 25 to 50 or up to 100 μ being attained; at this stage they are more or less divergent, continuous to pluriseptate, straight or geniculate, usually simple, sometimes denticulate, and frequently becoming paler towards the apex. The hyaline or coloured, clear or granular, acrogenous or pleurogenous conidia may be spherical to cylindrical, measuring 2 to 30 by 2 to 5 μ; the hyaline ones are ovoid or oblong-elliptical, often 5 to 8 by 3 to 4 μ, sometimes biguttulate, while the coloured are elongated 1- to 6-cellular, up to 30 by 3 to 5 μ (often uni- to bicellular and 12 to 20 μ long). Sometimes the conidia are much enlarged or swollen and muriform. Germination takes place by hyaline sprout conidia or germ-tubes, often produced apically or subapically but also laterally.

The new species differs from *S. fawcettii* [ibid., xii, p. 689] in its generally larger and coarser, olive-coloured fructifications.

PALO (M. A.). **A Sclerotium seed rot and seedling stem rot of Mango.**—*Philipp. Journ. of Sci.*, lii, 3, pp. 237–261, 12 pl., 1 graph, 1933. [Received April, 1934.]

A species of *Sclerotium* was found in August, 1930, causing a rot of the seeds and seedling stems of mangoes in a nursery in

Luzon, Philippine Islands. The disease killed 10 per cent. of the seedlings and resulted in the decay of many seeds before or during germination. The stem rot was associated with a white mycelium bearing sclerotia on the basal parts of the seedlings. A blackish-brown lesion developed below or slightly in advance of the growing mycelium, and when the latter completely encircled the stem the leaves wilted and the seedling died. Numerous sclerotia, turning chocolate-brown at maturity and measuring 0·6 to 1·6 mm. in diameter, were also found on the cotyledons of the rotted seeds.

A comparative cultural study of the mango *Sclerotium, S. rolfsii* from rice and tomato, and four strains of *S. delphinii* [*R.A.M.*, xiii, p. 99] on a number of standard media at varying temperatures between 6° and 35·5° C. showed that the first-named is more closely related to *S. delphinii* than to *S. rolfsii* and it is accordingly considered to be a strain of the former. Among the more important differences between the mango *Sclerotium* and *S. rolfsii* are the slower rate of sclerotial production on agar media in the former (eight to ten days, compared with four to five); the concave or flattened shape of the mango sclerotia; their hilum-like scars, and distinct pits [ibid., x, p. 693]; their larger dimensions, irregularity, relative scarcity, and Hay's brown or tawny coloration; and the slow growth and failure to form sclerotia in the mango fungus at 35° to 35·5°.

The pathogenicity of the mango strain of *S. delphinii* to mango seedlings was proved by inoculations at the stem bases with the mycelium and sclerotia from cultures and by planting the seeds in naturally infected soil. Other plants to which the organism was destructive in inoculation tests included cowpea, *Lagenaria leucantha* [*L. vulgaris*], *Luffa acutangula*, *Cucurbita maxima*, pepper (*Capsicum annuum*), eggplant, radish, and cabbage. In comparative inoculation tests with *S. delphinii* from mango and *S. rolfsii* from pepper, rice, and tomato, the former proved equally aggressive with the latter on young seedlings of mango, papaw, cabbage, radish, tomato, mustard, *Momordica charantia*, and rice.

Under dry conditions the sclerotia of *S. delphinii* were found to remain viable for over a year, and the fungus seems to persist indefinitely in moist nursery soil. Adequate control may be effected by strict sanitation and suitable cultural practices.

Banerjee (B. N.), Karmarkar (D. V.), & Row (G. R.). **Investigations on the storage of Mangoes.**—*Agric. and Live-stock in India*, iv, 1, pp. 36–53, 1934.

From the results [which are discussed and tabulated] of the writers' investigations (1930–3) on mango storage at Bangalore, it appears that the growth of the putrefactive bacteria and fungi (e.g., *Aspergillus niger*) is at a standstill during the earlier stages at 0° C. As the fruit ripens, however, and the sugar content increases, the low temperature alone may not be a sufficient deterrent, and the utilization of ethylene gas [*R.A.M.*, xii, pp. 20, 103] or acetaldehyde vapour [ibid., xii, pp. 46, 565] should then be considered as a supplementary measure.

RAISTRICK (H.) & SMITH (G.). **Studies on the biochemistry of micro-organisms. XXXV. The metabolic products of Byssochlamys fulva Olliver and Smith.**—*Biochem. Journ.*, xxvii, 6, pp. 1814–1819, 1933.

Byssochlamys fulva Olliver & Smith, a fairly common agent of spoilage in processed fruits in England [*R.A.M.*, xiii, p. 36], was grown at 24° on Czapek-Dox solution, on which it produced yields of mannitol equivalent to 30 per cent. of the sugar consumed. A new mould product, byssochlamic acid, $C_{18}H_{20}O_6$, M.P. 163·5°, was isolated to the extent of about 0·5 per cent. from the metabolism solution and proved to be toxic to mice.

BUTLER (O.). **Burgundy mixture.**—*New Hampshire Agric. Exper. Stat. Techn. Bull.* 56, 26 pp., 1933. [Received March, 1934.]

A study [the results of which are tabulated and discussed with numerous references to the relevant literature] of the different ratios of copper sulphate to crystallized sodium carbonate used in preparing Burgundy mixture showed that while mixtures made with different ratios all deteriorate on standing, the least stable are those in which the ratio lies between 1 : 1·15 and 1 : 1·5, the usual ratio range in practice [*R.A.M.*, viii, p. 552]. Within the usual ratio range the ratio of copper sulphate to crystallized sodium carbonate has more effect on stability than has strength in copper sulphate. The method of mixing the copper sulphate and sodium carbonate solutions only slightly effects the density of the precipitate, but the use of cold water is not recommended as it increases the amount of soluble copper present. In Burgundy mixture freshly made within the usual ratio range the percentage amount of soluble copper is within the tolerance of plants on which copper sprays can ordinarily be used; in dried mixtures within the range 1 : 0·9 and 1 : 1·84 it is much below this point and cannot be considered as a source of danger. Tartaric acid, citric acid, and sodium arsenite are effective stabilizers of Burgundy mixtures which, made with a 1 : 1 ratio and stabilized with 0·2 per cent. tartaric acid or 0·6 per cent. citric acid become free from soluble copper after standing; made with a 1 : 1·84 ratio and stabilized with 0·01 per cent. tartaric acid or 0·02 per cent. citric acid Burgundy mixtures contain under 0·0005 per cent. soluble copper. The addition of acid lead arsenate very slightly, and that of calcium arsenate very materially, reduces the percentage amount of soluble copper present. Mixtures with ratios of 1 : 1 and 1 : 1·84 are equally translucent, but those with a 1 : 1 ratio are less conspicuous after drying on the plant.

A Burgundy mixture with a 1 : 1 copper sulphate to crystallized sodium carbonate ratio meets all practical requirements.

HORSFALL (J. G.). **Zinc oxide as a seed and soil treatment for damping off.**—Abs. in *Phytopath.*, xxiv, 1, p. 12, 1934.

Red copper oxide [*R.A.M.*, xii, p. 232] has not proved altogether efficacious in the control of post-emergence damping-off of greenhouse plants caused by *Pythium ultimum* [ibid., xii, p. 643], against which zinc oxide (10 to 20 gm. per sq. ft.) has given very

satisfactory results on a commercial scale in New York. The poor penetrative capacity of this substance may be improved by its admixture with the covering soil or use with a seed treatment. Injury may result from the application of zinc oxide to transplanted seedlings.

WOODMAN (R. M.) & BARNELL (H. R.). **Wetting, spreading, and emulsifying agents for use with spray fluids. VII. The effect of gelatin on water losses from leaves.**—*Journ. Soc. Chem. Ind.*, lii, 43, pp. 352T–354T, 1933.

A brief account is given of laboratory tests with cut leaves of the cherry-laurel, the results of which indicated that the injurious effect that might be expected from gelatine films, of a thickness comparable to those that are formed after the application of a fungicidal spray containing gelatine as a spreader, in checking the loss of water from the leaves, is, in fact, statistically insignificant. It is believed, therefore, that the addition of gelatine or glue to a spray liquid is not likely to interfere with the normal transpiration of the leaves either by clogging the stomata or by preventing cuticular transpiration.

BOUTARIC (A.). **Sur l'appréciation du pouvoir mouillant des solutions ou des bouillies utilisées en agriculture.** [On the evaluation of the wetting capacity of the solutions or mixtures used in agriculture.]—*Comptes rendus Acad. d'Agric. de France*, xix, 29, pp. 1013–1020, 1933.

In this paper (to which P. Viala contributes an introductory note) the writer criticizes the methods in current use for the evaluation of the wetting capacity of fungicides and other materials used in spraying [*R.A.M.*, xi, p. 663; xiii, p. 45].

BAUDYŠ (E.). **Použití dusíkatého vápna v ochraně rostlin.** [The use of calcium cyanamide in plant protection.]—Pamphlet issued by the Agric. Exper. Stat. in Brno, (2nd augmented edit.), 48 pp., 25 figs., 1933.

The purpose of this pamphlet is to bring to the notice of practical agriculturists in Czecho-Slovakia the encouraging results obtained abroad and at home in local experiments in the use of calcium cyanamide for the control of a wide range of bacterial and fungal diseases of cultivated plants, and also of soil insects and weeds. The paper contains a fairly full list of the diseases and pests which have been shown to be amenable to control by this means, and special mention is made of the fungicidal action of calcium cyanamide on the spores of cereal rusts [*Puccinia* spp.], smuts [*Tilletia* and *Ustilago* spp.], and snow moulds (*Fusarium* spp.), hop powdery mildew (*Sphaerotheca humuli*), and the like. It also includes instructions for the correct dosages and times of applications.

JUHANS (J.). **Meie seemnehaigustest.** [Concerning seed-borne diseases.]—*Mitteil. Phytopath. Versuchsstat. der Univ. Tartu* No. 19, 13 pp., 1934. [German summary.]

This is a brief annotated list of the chief seed-borne diseases of economic crops which were observed by the author since 1927 in

the Esthonian branch of the International Seed Testing Association in Tartu [formerly Dorpat], and among which the following may be mentioned. *Botrytis anthophila* [see above, p. 381] was frequently observed on red clover [*Trifolium pratense*] seed imported from Poland, Lithuania, and Livonia, but rarely on seed of home production; the disease caused by the fungus appears, however, to have gained some ground in the south of Esthonia. *Colletotrichum lini* [*R.A.M.*, xiii, p. 372] was found on locally grown flax seed. Cruciferous seeds were found to be contaminated with spores of certain species of black moulds considered to be parasitic, e.g., *Alternaria brassicae* and *A. circinans* [ibid., xiii, p. 204]. Species of *Macrosporium* (which are believed probably to include conidial forms of *Pleospora herbarum*) occur very frequently and in large numbers on home-grown clover seeds.

IVANOFF (S. S.). **A plant inoculator.**—*Phytopath.*, xxiv, 1, pp. 74–76, 1 fig., 1934.

Details are given of an inoculator, consisting mainly of a hollow needle with a lateral opening, a barrel, and an air valve to regulate the outflow of the inoculum, which has been specially devised for the simple, rapid, and uniform infection of maize plants with the agent of bacterial wilt [*Aplanobacter stewarti*: *R.A.M.*, xiii, p. 298]. Using this instrument, over 100,000 plants were inoculated by four men in four days in 1933.

BLATTNÝ [C.]. **Vertikálni rozšiřeni virových chorob.** [Vertical spread of virus diseases.]—*Ochrana Rostlin*, xiii, 3–4, p. 145, 1933.

A few notes are given on the occurrence in 1933 of some virus diseases of cultivated and wild plants in the highlands of Slovenia. Mosaic of the stinging nettle (*Urtica dioica*) was found as high as 1,550 m. above sea level. Potatoes grown at an altitude of 1,050 m. suffered as much from mosaic and leaf curl as those which grew at from 800 to 1,000 m. Up to an altitude of 900 m. virus diseases were very prevalent and severe on a wide range of hosts, special mention being made of a vein mosaic of the barberry (*Berberis vulgaris*) which reduced the affected plants to complete sterility.

GÄUMANN (E.). **Neuere Erfahrungen auf dem Gebiete der pflanzlichen Immunitätslehre.** [Recent experimental work relating to the science of plant immunity.]—*Verh. Schweiz. Naturforsch. Gesellsch.*, cxiv, pp. 197–219, 1 fig., 4 graphs, 1933.

Summing up his interpretation of recent experimental work in the realm of plant immunity [cf. *R.A.M.*, xiii, p. 318], the writer considers that it is firmly established that certain plants are capable of forming antibodies and of exhibiting a biochemical immunity reaction which, however, is strictly local and not systemic. He points out some outstanding differences and analogies between plant and animal reactions to parasitic infection. In plants the parasite is for the most part actively aggressive [cf. ibid., xiii, p. 293], and the passive resistance of the host is a much more important element in its protection than the 'immune reaction' or active defence. In man and the warm-blooded animals, on the

other hand, the parasite is generally conveyed quite passively into the blood stream, where it meets with active resistance from the immunizing mechanism of the host. In addition, however, to these general humoral reactions which are restricted to the blood stream and thus specific to animals, the latter are also possessed of a concealed local cellular immune reaction, probably constituting a far-reaching analogy with the corresponding phenomenon in the vegetable kingdom.

HAENSELER (C. M.) & ALLEN (M. C.). **Toxic action of Trichoderma on Rhizoctonia and other soil fungi.**—Abs. in *Phytopath.*, xxiv, 1, p. 10, 1934.

Trichoderma [? *lignorum*] added to a soil heavily infested with *Rhizoctonia* reduced seed decay and damping-off on cucumbers and peas from 67 and 63 to 12 and 38 per cent., respectively, the corresponding decreases on *Pythium*-infested soil being from 69 and 77 to 12 and 47 per cent. A liquid nutrient medium, in which the fungus had grown for five days, proved lethal to *Rhizoctonia* and *Pythium* after passage through a filter. The toxic properties of the filtrate were destroyed by heating for ten minutes at 80° C., ageing in cotton-plugged test tubes or flasks for ten days, or bubbling oxygen through the medium for five minutes. The antagonism manifested by *Trichoderma* towards *Rhizoctonia* and possibly other soil pathogens may thus be partially attributable to the toxic action of its metabolic products [cf. *R.A.M.*, xii, p. 534].

FEHMI (S.). **Beiträge zur Kenntnis der Wechselbeziehungen zwischen Kulturpflanzen, ihren Parasiten und der Umwelt. (5. Mitteilung.) Untersuchungen über den Einfluss der Ernährung auf die Empfänglichkeit der Kartoffelknolle für Lagerparasiten und die Änderungen des enzymatischen Stoffwechselverlaufes während der Lagerung.** [Contributions to the knowledge of the interrelations between cultivated plants, their parasites, and the environment. (Note 5.) Investigations on the influence of nutrition on the susceptibility of the Potato tuber to storage parasites and the changes in the course of enzymatic metabolism during storage.]—*Phytopath. Zeitschr.*, vi, 6, pp. 543–588, 3 figs., 10 graphs, 1933.

Continuing the investigations initiated by Schaffnit at the Bonn (Rhine) Phytopathological Institute on the influence of environmental factors on the parasites of cultivated plants [*R.A.M.*, x, p. 478], the writer studied the part played by nutrition in the reaction of potato tubers to certain storage pathogens. Incorporated in the results are some unpublished data obtained by Frl. H. Farries in a preliminary investigation in 1929. The tubers tested were partly from pot cultures and partly from permanent field plots, in which the supplies of the principal nutrients were varied.

Two strains belonging to the *Bacillus phytophthorus* group were used in the experiments, viz., *B. phytophthorus* from C. Stapp, Berlin-Dahlem, and *B. atrosepticus* from the Centraalbureau voor Schimmelcultures, Baarn. There were no macroscopic differences between the two strains, but the latter was found to liquefy gelatine

more rapidly while the former produced a more virulent type of decay [ibid., viii, p. 396]. Neither strain caused infection of unwounded tubers (Modrows Industrie) kept at 10° C. with a relative atmospheric humidity of 80 per cent., irrespective of the nutrition of the plants. Under adverse respiratory conditions (high atmospheric humidity and damp storage) infection developed on uninjured tubers, the susceptibility of which, however, was not appreciably influenced by nutritional factors. Unwounded tubers contract infection by *B. phytophthorus* almost exclusively through the eyes. The thickness of the cork layer is of importance only in so far as a thicker skin gives greater protection against invasion through wounds. The thickest cork layers were formed by tubers from plants supplied with an excess of phosphoric acid and little nitrogen. Resistance (gauged by the reaction of the middle lamella to bacterial invasion) was highest in the tubers from plants receiving an excess of potash (kainit) and no phosphoric acid or nitrogen and lowest in those manured with ammonium sulphate or potassium nitrate. The heaviest storage losses (20·8 and 17·5 per cent. decay) occurred among the tubers from plants manured with an excess of ammonium sulphate and calcium cyanamide, respectively, and the smallest (2·8 per cent.) in the series deprived of nitrogen. Of the 36 potato varieties tested for their reaction to the two above-mentioned bacterial strains, Rotkaragis, Prozentragis, Deodara, and Beseler were the most resistant to the spread of infection, and Eigenheimer, Gelbkaragis, Böhms Edeltraut, and Silesia the least so. Resistance to the dry rot caused by *Fusarium coeruleum* was also highest among tubers from plants receiving an excess of potash and no nitrogen, and lowest in those deprived of potash.

The three metabolic processes of transpiration, starch conversion, and respiration were distinctly influenced by the nutrition of the tubers. The highest total loss of carbohydrates occurred among those given an excess of nitrogen and insufficient potash and the lowest in the series receiving a scanty supply of the former. The metabolic differences induced by varying nutritional systems did not, however, persist in the progeny of the experimental material.

It is apparent from the author's data that an unbalanced nitrogen supply and a shortage of potash must be avoided in the potato-manuring programme. The absolute exclusion of nitrogen is impracticable on a large scale owing to the accompanying reductions of yield, but it should definitely be kept at a minimum in relation to the other constituents of the fertilizer.

Schultz (E. S.), Bonde (R.), & Raleigh (W. P.). **Components of Potato mild mosaic.**—Abs. in *Phytopath.*, xxiv, 1, p. 17, 1934.

Mild mosaic, manifested by irregular, pale green spots, and slight wrinkling on Green Mountain potatoes [*R.A.M.*, xii, p. 612], has been found to consist of two components, viz., a latent one masked in Green Mountain and many other varieties, and another causing the development of pale green, slightly rugose leaves on a seedling resistant to the latent component and on a virus-free Green Mountain seedling. Aphids transmit the second component, but not the latent one [cf. ibid., xiii, p. 49], separation being

further effected by a seedling potato taking the former but not the latter. Mild mosaic was induced in Green Mountains by inoculation with both components, while plants already harbouring the latent principle contracted the disease on inoculation with the active one.

List (G. M.) & Daniels (L. B.). **A promising control for psyllid yellows of Potatoes.**—*Science,* N.S., lxxix, 2039, p. 79, 1934.

The estimated reduction of the 1932 potato crop in Colorado from psyllid yellows [*R.A.M.*, xiii, p. 151] was 8 million bushels. No evidence has so far been obtained in support of the bacterial or virus theories of the origin of the disease, which appears more likely to arise from a toxin injected into the plants by the psyllid, *Paratrioza cockerelli*, in the course of feeding. Very promising results in the control of yellows have been given by a single spraying with lime-sulphur (33° Baumé) at the rate of 1 in 40, for the destruction of the insects.

Braun (H.). **Pfropfenbildung in der Kartoffelknolle.** ['Pfropfen' formation in the Potato tuber.]—*Zeitschr. für Pflanzenkrankh. u. Pflanzenschutz,* xliv, 1, pp. 24–35, 2 figs., 1934.

During 1933 the writer, in the course of his official inspections of German seed potato stands, was obliged for the first time to refuse certification on account of 100 per cent. 'Pfropfenbildung' [*R.A.M.*, xi, p. 199] in the Ebstorf Goldfink and Industrie varieties. This condition, so named because the compact wad of necrotic tissue can be drawn out of the tuber like a cork, has hitherto been practically ignored in Germany as a possible cause of serious injury. Only Hiesch (*Pflanzenbau*, ix, p. 104, 1932) appears to have recognized the severity of the disease in Hanover, where in 1929 healthy seed outyielded the affected by 35 per cent.

The symptoms of the disturbance are briefly described and the question of its synonymy discussed at some length. It is very difficult to interpret the exact meanings of the various writers on necroses of this type, but it appears certain that 'Pfropfenbildung' is synonymous with the Dutch 'kringerigheid', 'kranzigheid', or 'veekkerigheid' and the English 'spraing' [*R.A.M.*, xii, p. 653]. The relationship of 'Eisenfleckigkeit' or 'Buntfleckigkeit' to 'kringerigheid' is not clear, while further confusion is introduced by the use of the term 'internal rust spot' for distinct disorders [ibid., xi, p. 320] which have no connexion with the condition under discussion. 'Pfropfenbildung' was first observed in Holland at the turn of the century, possibly by R. Bos in 1898–9 (*Landbouw Tijdschr.*, 1899). In Germany the first record of the disease dates from 1910, about which time it was also reported from England under the name of 'sprain' (*Journ. Board Agric.*, xvi, pp. 33, 647, 1909–10).

The damage caused by 'Pfropfenbildung' involves both the culinary qualities of the tubers and their utility for seed purposes. Cases are known in which an entire crop from selected seed had to be used for fodder, while Hiesch found that affected tubers are particularly liable to storage rots and germinate poorly. There is no real evidence that 'Pfropfenbildung' is hereditary, and its

occurrence seems to be correlated to some extent with weather and soil conditions, its development being favoured by a hot, dry summer and an abundance of sand or gravel in the soil. The underlying cause of the disturbance, however, remains obscure, Quanjer's attempts to isolate an organism from diseased material having failed [*R.A.M.*, v, p. 573] and no actual proof being available of the implication of environmental factors. In these circumstances no definite measures for combating 'Pfropfenbildung' can be formulated beyond the ordinary rules of plant hygiene, possibly supplemented by the development of resistant varieties, but in the latter connexion more consistent information is required.

Van Der Plank (J. E.). **Internal brown fleck of Potatoes.**—*Farming in South Africa*, viii, 91, pp. 383–384, 1 fig., 1933.

All varieties of potatoes grown in South Africa appear to be susceptible to internal brown fleck which, however, is confined to acid sandy soils, and the application of lime, at the rate of 1,000 to 2,000 lb. per half morgen, usually gives good control, the beneficial effects persisting for five to ten years. Superphosphates are also useful in checking the tendency to internal brown fleck, which is promoted, on the other hand, by ammonium sulphate. Flecked seed has been found to produce a clean crop on suitable soil, whereas clean seed can give a diseased stand on unsuitable ones. From the evidence at present available internal brown fleck does not seem to be infectious.

Mitra (A.). **A new wound parasite of Potato tubers.**—*Nature*, cxxxiii, 3350, p. 67, 1934.

The writer inoculated monospore cultures of *Fusarium viride* (renamed by Wollenweber [*R.A.M.*, x, p. 626] *F. solani* var. *medium*) into potato tubers at Allahabad, India. After 24 days at a temperature of 20° to 25° C. all the inoculated tubers showed an advanced dry rot with a wrinkled sunken patch and whitish pustules on the surface near the plug. *F. solani* var. *medium* was reisolated in pure culture from the infected areas. Negative results were given by inoculation with *F. moniliforme* [*Gibberella moniliformis*], *F. camptoceras*, *F. diversisporum*, and *F. semitectum* and its var. *majus* [ibid., xiii, p. 128]. All the controls remained healthy.

This appears to be the first record of *F. solani* var. *medium* as a parasite of the potato.

Poole (R. F.). **Sweet-Potato ring rot caused by Pythium ultimum.**—Abs. in *Phytopath.*, xxiv, 1, p. 16, 1934.

Pythium ultimum [see above, p. 388] was found to be the cause of a soft, ring-like decay of sweet potatoes, proceeding from one side of a root to the other without involving all the tissues. The fungus produces amylase, pectinase, and protease. Rotting occurs in 26 to 48 hours and complete rings are formed in three days in a saturated atmosphere at 20° C. Ring rot developed in all the commercial sweet potato varieties tested, Jersey and Nancy Hall

being apparently the most susceptible. Severe infection occurred on crops harvested after the heavy autumn rains.

Tullis (E. C.) & Cralley (E. M.). **Laboratory and field studies on the development and control of stem rot of Rice.**— *Arkansas Agric. Exper. Stat. Bull.* 295, 23 pp., 6 figs., 1933.

A comprehensive account is given of the writers' laboratory and field studies in Arkansas on the life-history and control of stem rot of rice (*Leptosphaeria salvinii*) [*R.A.M.*, xiii, p. 322].

The symptoms of the disease are described and the taxonomy of the causal organism briefly discussed. The minimum, optimum, and maximum temperatures for the growth of the fungus were found to be below 13°, 25° to 30°, and 32° to 35° C., respectively, and the optimum hydrogen-ion concentration ranged from P_H 6·5 to 8. Three definite stages may be recognized in the invasion of the rice tissues and subsequent collapse of the culm, the first represented by the production of small, black lesions on the outer leaf sheaths, the second by the infection of the culm, and the third by invasion of the central cavity of the latter. In the initial phase the mycelium may be found throughout the invaded tissues, hyphal mats occurring on the inner surfaces of the sheaths and appressoria on the outer ones. During this stage many tillers are attacked and killed. The second stage of invasion coincides with the abundant production of mycelium and appressoria over the culm surface. Above this growth are formed patches of dense sclerotial masses, evidently containing a pectin-dissolving enzyme which affects the underlying sclerenchymatous tissue. At this juncture small mycelial branches force their way into the culm between the epidermal cells and the outer layers of sclerenchyma, or sometimes through the pits. On reaching a vascular bundle the fungus makes a rapid longitudinal and radial advance into the culm, accompanied by browning of the cells and disintegration of their contents. Ultimately a cottony mycelial weft is produced throughout the internodal cavity, and the invasion of the parenchyma of the culm soon completes the destruction of all but the outer sclerenchyma. The weakening of the culm due to the dissolution of the parenchyma causes its collapse.

The perfect stage has only been found on cultivated rice, but the conidial stage (*Helminthosporium sigmoideum*) occurs also on *Zizaniopsis miliacea*, while the sclerotial stage (*Sclerotium oryzae*) has in addition been observed on the short barnyard grass *Echinochloa colona* [*Panicum colonum*]. The sclerotia are responsible for primary infection and also for the perpetuation of the fungus over a lengthy period (several years). The conidia cause primary and also secondary infection. The role of the ascigerous stage in the life-history is as yet unknown, but the ascospores remain viable for at least a year in the laboratory, and if the perithecia overwinter on stubble they may also be a source of primary infection in the following season.

Of the various control measures discussed in some detail, the most promising appears to be the withholding of standing water from the fields for a time prior to maturity, though enough should

be present to keep the ground muddy throughout the growing season.

NISIKADO (Y.), MATSUMOTO (H.), & YAMAUTI (K.). **Reports on the physiologic specialization of Fusarium. I. On the differentiation of the pathogenicity among the strains of Rice-'bakanae'-fungus. II. Temperature relations to the growth of the Rice-'bakanae'-fungus.**—*Ber. Ōhara Inst. Landw. Forsch.*, vi, 1, pp. 113–147, 1 graph, 1933.

The results of the writers' studies on physiologic specialization and temperature relations in the 'bakanae' fungus of rice (*Lisea* [*Gibberella*] *fujikuroi*), which are here presented in a comprehensive form and supplemented by 18 tables, have already been noticed in this *Review* from other sources [*R.A.M.*, xii, p. 719; xiii, p. 323].

HOERNER (G. R.) & JONES (W.). **Crown treatments for Hop downy mildew control.**—*Phytopath. Zeitschr.*, vi. 6, pp. 619–626, 1933.

The information in this paper on the successful control of hop downy mildew (*Pseudoperonospora humuli*) in British Columbia and Oregon by spring treatment of the crowns with copper-containing dusts has already been summarized from another source [*R.A.M.*, xii, p. 325].

BLATTNÝ (C.). **Kažení barvy, vůně a ostatních vlastností Chmele (Humulus lupulus).** [Spoilage of the colour, odour, and other properties of Hops (*Humulus lupulus*).]—*Ochrana Rostlin*, xiii, 3–4, p. 144, 1933.

The examination of samples of hops stored for three years in Czecho-Slovakian warehouses showed the abundant presence on them of black moulds, chiefly *Cladosporium* and *Hormodendron* species, which materially affected the keeping qualities of the product, and to a lesser extent of species of *Botrytis*, *Penicillium*, and *Rhizopus*; bacteria were very poorly represented. It was noticed, however, that hops that had been treated with Bordeaux mixture against downy mildew [*Pseudoperonospora humuli*] suffered considerably less in storage from the black moulds.

CURZI (M.). **Il deperimento del Piretro nell' isola di Cherso.** [The wilt of Pyrethrum in the island of Cherso.]—*Boll. R. Staz. Pat. Veg.*, N.S., xiii, 4, pp. 537–553, 4 figs., 1933. [English summary.]

The plantations of pyrethrum (*Chrysanthemum cinerariaefolium*) growing in the island of Cherso in the Adriatic have during the past twelve years become affected by a wilt which has grown progressively worse, increasingly curtailing the life of the crop. The affected plants show a reduced development of the aerial parts, flower production declines, the leaves are under-sized, yellowish, and dry up, and finally the whole plant wilts and dies. Wilted plants are almost devoid of secondary roots, those found being discoloured and rotted. Sections of the discoloured roots of affected plants constantly showed the presence of species of

Fusarium, mostly belonging to the section *Martiella*. In some of the roots *F. javanicum* var. *radicicola* was actively parasitic, and this fungus is regarded as the cause of the disease on those plants on which it was found. Another *Fusarium*, also parasitic on this host, and morphologically similar to, though having different cultural characters from, *F. javanicum* var. *radicicola*, was also isolated.

The author considers that the disease, which has been favoured by unsuitable cultural practices, is a fusariosis probably due to more than one species or strain of *Fusarium*. Further investigations on this point are in progress.

The paper terminates with notes on control by improved sanitary methods.

Results from imported Canes.—*South African Sugar Journ.*, xvii, 11, pp. 573–575, 577, 3 figs., 1933.

In connexion with a report on certain properties of nine imported sugar-cane varieties which have been under experimental observation at the farm and factory of V. Crookes, a leading Natal agriculturist, the value of interplanting maize with the canes as a protection against streak [*R.A.M.*, xiii, p. 126] is emphasized. Although opposed to the hitherto recognized scientific practice, this method is stated to have reduced the incidence of infection to between 2·5 and 5 per cent.—alleged to be the lowest in the industry. The jassid [*Cicadulina mbila*] responsible for streak transmission prefers to feed on the maize, and by the time the latter has been harvested the winter is approaching and the insect remains dormant until the spring, when the canes are sufficiently vigorous to withstand its depredations.

Matz (J.). **Relative infectivity of mosaic virus extracted from various parts of Sugarcane.**—Abs. in *Phytopath.*, xxiv, 1, pp. 14–15, 1934.

Using improved methods for the inoculation of sugar-cane with juice extracted from mosaic plants [*R.A.M.*, xii, p. 660], the writer made tests to determine the possible existence, in a diseased individual, of specific regions wherein the activity of the virus is to some extent inhibited. It was found that, in a given shoot, the juices from infected expanded lamellae of young and mature green leaves, midribs, leaf sheaths, and true stems, separately, show an equal degree of infectiousness (80 to 100 per cent.), whereas in a parallel series of inoculations a relatively low measure of virulence (0 to 50 per cent.) characterized the juices from the rolled inner white and brittle portion of the leaf bases in the lower region of the bud. There was no reduction of virulence on adding equal portions of the juice from the latter region or from the healthy green foliage to virulent green leaf juice.

McClean (A. P. D.). **Cold chlorosis or sectional chlorosis of Sugar Cane.**—*South African Sugar Journ.*, xviii, 1, p. 31, 1934.

A further brief note is given on the occurrence of cold chlorosis of sugar-cane in Natal and Zululand [*R.A.M.*, xiii, p. 126], where

a minimum temperature of 13° C. is apparently necessary for its development. The injury resulting from this disturbance is stated to be of little or no importance, and in any case there is no practical means of avoiding it.

SAWADA (K.). **Descriptive catalogue of the Formosan fungi. Part VI.**—*Rept. Dept. Agric. Res. Inst. Formosa*, 61, 117 pp., 2 pl., 1933. [Received April, 1934.]

A number of interesting fungi are described in Japanese as new, including *Oidiopsis capsici* [*R.A.M.*, xi, p. 183] on *Capsicum annuum*, *O. papaveris* on *Papaver somniferum*, *Cicinnobolus nicotianae* on *Oidium* of *Erysiphe nicotianae*, *Colletotrichum medicaginis-denticulatae* on *Medicago denticulata*, *Sclerotium cinnamomi* on *Cinnamomum camphora*, and several species of *Oidium*. Illustrations are given of a number of species, including most of the above and also *Phakopsora sojae* (P. Henn.) Saw. (syn. *Uredo sojae* P. Henn.) on soy-bean, *Ramularia citrifolia* Saw. on *Citrus* sp., and *Septobasidium citricolum* on *C.* spp. English fungus and host indices are appended.

LIND (J.). **Studies on the geographical distribution of Arctic circumpolar Micromycetes.**—*Danske Vidensk. Selsk. Biol. Meddel.*, xi, 2, 152 pp., 1934.

A list, supplemented by critical and taxonomic observations and by a five-page bibliography, is given of 422 species of fungi observed by the writer in a personal examination of the Arctic plant collections deposited during the past 60 years at the Copenhagen Botanical Museum [cf. *R.A.M.*, xii, p. 469]. The present work is stated to be the first attempt to assemble the scattered records of Arctic mycological investigations and so obtain continuity in the knowledge of the distribution of fungi in the countries concerned.

No genus of fungi appears from the author's studies to be strictly endemic in the northern Polar region. A high percentage of the species under observation are known both from the Arctic and the Alps, and it is of interest to note that the fungi capable of flourishing in the aridity of the far north are usually widespread over the globe [cf. ibid., xii, p. 579].

FRANÇAIS (J.). **Observations mycologiques et essais microphotographiques.** [Mycological observations and microphotographic experiments.]—*Rev. Path. Vég. et Ent. Agric.*, xx, 6–7, pp. 261–268, 2 pl., 1933. [Received March, 1934.]

After describing a staining technique which showed the presence of starch in the hypertrophied tissues of pear leaves surrounding the aecidia of *Roestelia cancellata* [*Gymnosporangium sabinae*: *R.A.M.*, xi, p. 799], the author states that after a hot, dry summer the berries and stalks of a vine near Epinal bore numerous perithecia of *Uncinula spiralis* [*U. necator*: ibid., x, p. 641] measuring 90 to 120 (average 103) μ in diameter, furnished with 10 to 40 (average 17 to 23) septate appendages 4·7 μ wide, and containing 6 piriform asci 54 by 39 μ, each with 6 ascospores 15 by 10 μ.

Salix purpurea trees near Epinal were severely attacked by *U. salicis* [ibid., xii, p. 666].

Sartory (A.), Sartory (R.), & Meyer (J.). **Le cycle évolutif des Actinomyces dans les cultures après passage à travers l'ultra-filtre de collodion.** [The evolutionary cycle of *Actinomyces* in culture after passage through a collodion ultra-filter.]—*Comptes rendus Acad. des Sciences*, cxcvii, 23, pp. 1465–1467, 1933.

Using Malfitano's and Sigaud's technique (*Ann. Inst. Pasteur*, xliii, p. 190, 1929), the writers subjected to ultrafiltration through collodion sacs cultures of *Actinomyces bovis* and of a strain of *Actinomyces* of proved pathogenicity to man [*R.A.M.*, xi, p. 514]. The organisms developed intra-filtrating corpuscles; 'symplasts' or swollen, amorphous, Gram-negative rods with minute, Gram-positive granules at the limit of visibility, presumably nuclear vestiges; a pseudodiphtheric stage consisting of Gram-positive rod- or club-shaped, irregular, connected, branched elements; a pseudostreptococcic phase; a biodynamogenic stage (formed in cultures of three weeks old and upwards on liquid Sabouraud's medium with malt at P_H 5·8), represented by long rods containing two large nuclear corpuscles and previously described by Lieske and Antonioli as 'T' or 'double Y' elements; and a stage commencing by longitudinal budding in the manner of *Clostridium* but finally evolving into the typical *Actinomyces* hyphae with arthrospores.

Three of the phases composing this life-cycle are morphologically irreversible, namely, the ultra-filtrating, pseudostreptococcic, and hyphal stages.

Drechsler (C.). **Pythium butleri and Pythium aphanidermatum.**—Abs. in *Phytopath.*, xxiv, 1, p. 7, 1934.

In studies of nearly 100 isolations, from various plants, of the *Pythium* type characterized by lobulate sporangia and broadly applied, swollen antheridia, two cultures from diseased tobacco seedlings in Sumatra and three from affected sugar-cane roots in Louisiana appeared to differ from the rest. The zoosporangia were generally smaller and derived from much less swollen and less profusely branched elements. The zoospores were also smaller (9 instead of 11·μ in diameter), with corresponding reductions in the oogonial and oospore dimensions, the former averaging 22 instead of 27 μ and the latter 17·5 compared with 22·5 μ. The antheridium also is smaller and much more frequently produced immediately adjacent to the oogonium. The smaller of these two species is thought to be probably identical with *P. aphanidermatum* and the larger with *P. butleri* [*R.A.M.*, xii, pp. 450, 723].

Holmes (F. O.). **Masked strain of Tobacco-mosaic virus.**—Abs. in *Phytopath.*, xxiv, 1, pp. 11–12, 1934.

A strain of the tobacco mosaic virus, the effects of which are masked in *Nicotiana tabacum*, resembles the ordinary strain in its reactions to heating, storage, and dilution, as well as in its host range. In all necrotic type hosts the primary lesions of both strains are indistinguishable in appearance, whereas in those

developing systemic necrosis or intense yellowing [*R.A.M.*, xiii, p. 330] the symptoms of the masked strain are less severe. Hosts in which mottling is induced by the ordinary strain serve as symptomless carriers of the masked one. In tobacco both the masked and ordinary strains of the mosaic virus cause abnormal starch retention in recently affected leaf tissues. The systemic spread of the virus is less extensive in plants infected by the masked strain.

Vinson (C. G.). **Purification of the virus of Tobacco mosaic.**—Abs. in *Phytopath.*, xxiv, 1, p. 20, 1934.

The infectivity of the juice from mosaic tobacco plants may be increased by the addition of activated charcoal following that of Lloyd's reagent [*R.A.M.*, xii, p. 332]. A small quantity of normal solution of aluminium sulphate forms a flocculent precipitate when added to the virus fraction obtained on decomposing the safranin precipitate of the virus with Lloyd's reagent. This precipitate, containing the infectious agent, packs sufficiently to permit complete decantation of the supernatant liquid, which shows little virulence. Magnesium sulphate may also be used to separate the virus from the above-mentioned fraction, but a much larger quantity of this substance is required.

Kunkel (L. O.). **Tobacco and aucuba-mosaic infections by single units of virus.**—Abs. in *Phytopath.*, xxiv, 1, p. 13, 1934.

When two samples of tobacco juice containing the viruses of aucuba and tobacco mosaic, respectively, are mixed in equal proportions or otherwise up to one part of either in 30 parts of a mixture, and used for needle inoculations of mature leaves of *Nicotiana langsdorffii*, circular necrotic lesions develop round the sites of infection. By testing on *N. sylvestris* the presence in a given lesion of the tobacco or aucuba mosaic virus or a mixture of the two was demonstrated, the mixture being only seldom recovered. Each virus being readily transmissible by the needle-puncture method, it would seem that in the great majority of cases infection was due to a single virus unit, the resultant lesions being comparable to bacterial colonies isolated by the Koch-plate method.

Johnson (B.). **Concentration of the virus of the mosaic of Tobacco.**—*Amer. Journ. of Botany*, xxi, 1, pp. 42–53, 1934.

A direct current of 110 volts was found to induce the rapid precipitation of part of the substances present in the juice of mosaic plants, while leaving the virus in suspension. Ammonium sulphate proved to be the most suitable of the salts used for the partial salting out of the virus, having the least inactivating effect and inducing the most thorough precipitation. Certain activated carbons, e g., nuchar 00, at low concentrations (2·5 per cent.) may be used to clarify the juice of mosaic plants, at the same time leaving the virus in suspension. Details are given of a method for the preparation of highly concentrated and partially purified suspensions of the mosaic virus [cf. *R.A.M.*, xii, p. 648; xiii, p. 328]. A definite difference was observed in the protein reactions of the concentrated juice from healthy and diseased plants, and it appears

very probable that the virus must be concentrated before any protein present in it can be detected.

Bechhold (H.) & Schlesinger (M.). **Grösse von Virus der Mosaikkrankheit der Tabakpflanze.** [The size of the virus of the mosaic disease of the Tobacco plant.]—*Phytopath. Zeitschr.*, vi, 6, pp. 627–631, 1933.

The writers' protracted investigations [details of which are given] at the Frankfurt-am-Main Colloid Research Institute have shown that the tobacco mosaic virus consists of particles about 50 $\mu\mu$ in diameter [*R.A.M.*, xii, p. 309], i.e., approximately the same as a medium-sized bacteriophage and considerably smaller than those determined by the authors for the smallpox, herpes, canary, and fowlpox viruses (200, 200, 120, and 110 $\mu\mu$, respectively). The centrifuging method employed in these determinations is stated to have been fully described in the authors' papers on the animal viruses (cf. *Zeitschr. für Hygiene*, cxv, p. 342, 1933).

Henderson (R. G.). **Effect of air temperature on Tobacco ring-spot infection.**—Abs. in *Phytopath.*, xxiv, 1, pp. 10–11, 1934.

It was shown by greenhouse and incubator studies that the development of ring-spot symptoms in tobacco [*R.A.M.*, xiii, p. 330], following artificial inoculation, is influenced by the air temperature at which the plants are grown. No symptoms were manifested at temperatures above 93° F., but at 80° to 85° they developed in four to five days. No further signs of infection were shown by plants with primary lesions on the inoculated leaves on transference from a relatively low to a high temperature. On the other hand, plants on which no symptoms had appeared during several days at a high temperature developed primary lesions on removal to a lower one.

Tobacco growers ! Important notice. The 'kromnek' disease of Tobacco.—*Rhodesia Agric. Journ.*, xxi, 1, pp. 9–10, 1934.

Tobacco plants in Southern Rhodesia have recently shown symptoms [which are briefly described] closely resembling those of the virus disease known in South Africa as 'kromnek' or Kat River wilt [*R.A.M.*, xiii, p. 129]. Attempts to ascertain the distribution of the disease are being made, in order that prompt steps may be taken to prevent an epidemic.

Clayton (E. E.) & Gaines (J. G.). **Progress in the control of Tobacco downy mildew.**—Abs. in *Phytopath.*, xxiv, 1, p. 5, 1934.

The location of tobacco beds on virgin soil in remote areas, soil sterilization, and seed treatment all proved ineffectual against downy mildew [*Peronospora hyoscyami*: *R.A.M.*, xiii, p. 333] in the United States. Tests of a large number of *Nicotiana tabacum* varieties showed all to be susceptible, the Turkish Xanthia being least affected, while *N. rustica* is resistant. Recovered plants showed a higher degree of resistance to infection than those not previously attacked. Spraying with Bordeaux mixture gave adequate control on very young seedlings, but the outcome of

extensive plant bed trials in 1932–3 at different places in five States are disappointing. None of the other liquid and dry fungicides [which are listed] excelled Bordeaux mixture. Control of the disease was obtained in plant beds heated at night to maintain a temperature of 70° F. or above during the critical period for infection.

HENDERSON (R. G.). **Experiments on the control of downy mildew of Tobacco.**—Abs. in *Phytopath.*, xxiv, 1, p. 11, 1934.

Calcium sulphide (cal-mo-sul) [*R.A.M.*, xiii, p. 310] was the only one of several fungicides tested against downy mildew of tobacco (*Peronospora hyoscyami*) [see preceding abstract] on plant beds in 1933 that gave results approximating to commercial control. Under greenhouse conditions more frequent applications are necessary to ensure a comparable outcome, and this treatment was found to cause a noticeable reduction of growth.

NORTON (J. B. S.) & HUNTER (H. A.). **Tomato diseases and their control.**—*Maryland Agric. Exper. Stat. Bull.* 345, pp. 490–494, 1933. [Received April, 1934.]

This is a brief guide to the more important tomato diseases found in the United States. Numerous bibliographical references (mostly to bulletins published by the American Experiment Stations) are given and the paper terminates with general directions for control.

HEUBERGER (J. W.) & NORTON (J. B. S.). **The mosaic disease of Tomatoes.**—*Maryland Agric. Exper. Stat. Bull.* 345, pp. 447–486, 2 figs., 2 graphs, 1933. [Received April, 1934.]

This account of the authors' investigations of tomato mosaic [the results of which are tabulated, expressed graphically, and fully discussed] deals, among others, with the following points: factors influencing the development of the symptoms, stage when infection occurs, spread during cultural operations, effect on the canning quality of the crop, the drying rates of the leaves, the transpiration rate, method of overwintering of the virus, and control. There is a bibliography of 39 titles.

THORNTON (M. H.) & KRAYBILL (H. R.). **Further studies on a noninfectious leaf-deforming principle from mosaic Tomato plants.**—Abs. in *Phytopath.*, xxiv, 1, p. 19, 1934.

On autolysis of the expressed juice of mosaic tomato plants and the inactivation of the virus by boiling, the juice was found to contain the non-infectious, leaf-deforming principle previously described by Kraybill and collaborators [*R.A.M.*, xi, p. 754]. The activity of the juice was not diminished by precipitation of the proteins with alcohol or acetone or by extraction with ether. Numerous attempts to obtain active preparations from healthy plants gave negative results. Preparations from the fresh juice of tomato plants showing 'fern-leaf' symptoms induced by inoculation with cucumber mosaic were inactive. Tomato plants showing marked symptoms resulting from inoculation with the non-infectious, leaf-deforming principle and those with typical mosaic

were lower in reducing-sugars, sucrose, starch, and hemicellulose, and higher in total and nitrate nitrogen than healthy plants.

KORDES (H.). **Einige Massnahmen des Pflanzenschutzes im Tomatenbau.** [Some plant protective measures in Tomato cultivation.]—*Nachricht. über Schädlingsbekämpf.*, viii, 4, pp. 137–142, 4 figs., 1933. [English summary on pp. 184–185.]

For the control of the tomato diseases caused by *Phytophthora infestans*, *Bacterium* [*Aplanobacter*] *michiganense*, and *Didymella lycopersici* [*R.A.M.*, xii, pp. 662–663], the writer recommends, on the basis of his lengthy experience in the Palatinate, seed treatment with ceresan or tillantin R; the disinfection of trays, hot-bed casings, and the like with 0·25 to 0·3 per cent. uspulun or 0·125 per cent. liquid ceresan and of the sticks for training the plants with 0·5 per cent. formalin; immersion of the seedling roots in a thin clay paste diluted with uspulun or ceresan; and the repeated application to the young plants of a copper mixture (0·5 to 1 per cent.). The last-named measure is ineffectual, however, against bacterial wilt, the transmission of which is effected by the knives or hands in topping the growing plants.

REUSRATH (T.). **Erfolgreiche Bekämpfung der bakteriellen Tomatenwelke und der Tomatenstengelfäule.** [The successful control of bacterial wilt and stem rot of Tomatoes.]—*Ratschläge für Haus, Garten, Feld*, ix, 1, pp. 9–11, 1 fig., 1934.

It is claimed that the serious losses (up to 90 per cent. of the crop) caused in Germany by the tomato diseases due to *Bacterium* [*Aplanobacter*] *michiganense* and *Didymella lycopersici* [see preceding and next abstracts] may be reduced to a minimum by seed disinfection with uspulun or ceresan; dipping of the seedlings before transplanting in a loam emulsion with the addition of 0·5 per cent. each of uspulun and solbar; one hour's immersion of the sticks, &c., used for training the plants in 1 per cent. uspulun; and one or two applications of a mixed spray of uspulun and solbar (0·5 per cent. of each) to the young plants.

KOCH (R.). **Die Behandlung der Tomatenpflanzen mit Uspulun gegen die Tomatenstengelfäule und die bakterielle Tomatenwelke.** [The treatment of Tomato plants with uspulun against Tomato stem rot and bacterial wilt.]—*Ratschläge für Haus, Garten, Feld*, ix, 1, pp. 11–12, 1934.

Since 1930 the writer has conducted a systematic campaign against stem rot [*Didymella lycopersici*] and bacterial wilt of tomatoes [*Aplanobacter michiganense*: see preceding abstracts] with uspulun, employed as follows: 20 minutes' immersion of the seed in a 0·4 per cent. solution; spraying the propagating frame at the same concentration and washing the exterior woodwork at 0·25 per cent.; spraying the glasshouse (inclusive of soil) with a 0·4 per cent. solution, washing the windows at 0·25 per cent., and dipping the strings for training at 0·5 per cent.; spraying the transplanted seedlings at 0·25 per cent. (1) ten days after removal

from the seed-bed and (2) three days before potting; and dipping the plants, immediately prior to planting out in the greenhouse, in a bath containing a 0·25 per cent. solution. In 1930 only 34 out of 1,000 plants thus treated contracted bacterial wilt, as against 155 the previous year, and 32 stem rot; in 1931, 76 out of 3,000 developed wilt and 290 stem rot.

NORTON (J. B. S.). **Fusarium wilt of Tomatoes.**—*Maryland Agric. Exper. Stat. Bull.* 345, pp. 487–489, 1933. [Received April, 1934.]

A brief, popular account is given of tomato wilt (*Fusarium lycopersici*), with notes on its distribution in Maryland and on breeding tests carried out in the United States for the production of resistant varieties [cf. *R.A.M.*, xiii, p. 218].

AGERBERG (L. S.), SCHMIDT (M.), & SENGBUSCH (R. v.). **Der Einfluss künstlicher Kultur auf das Verhalten der Konidien von Cladosporium fulvum.** [The influence of artificial culture on the conidial behaviour of *Cladosporium fulvum*.]—*Planta*, xxi, 3, pp. 511–513, 1933.

Comparative observations on the morphological and physiological characters of *Cladosporium fulvum* conidia direct from tomato leaves and in dextrose agar cultures revealed far-reaching differences. The leaf conidia are longer and narrower than those developing in pure culture, the former being predominantly elongated and non- to biseptate while the latter are mostly uniseptate, broadly oval, and much more regular than on the natural substratum. The germination-inhibiting effect of concentrated solanin solutions [*R.A.M.*, xiii, p. 134, and next abstract] is much less pronounced on the leaf conidia than on those in pure culture, which are affected by this substance at a very low strength. In tomato or potato leaf decoctions the leaf conidia of *C. fulvum* form normal long, sparsely branched hyphae, showing no tendency to the 'antlering' characteristic of 'culture' conidia under similar conditions [loc. cit.]. Only in the expressed sap of tomato leaves do the leaf conidia incline to 'antlering'; this phenomenon may be due to a slight toxic action of the alkaloid at a low concentration, to which in general the 'culture' conidia are particularly susceptible. In leaf decoctions of *Solanum racemigerum* the 'culture' conidia germinate only when the medium is boiled for upwards of ten minutes, whereas those from the leaf germinate consistently irrespective of the boiling period.

Inoculation experiments with conidia from quite young dextrose agar cultures gave negative results on tomatoes, which contracted the usual symptoms of leaf mould on inoculation with leaf conidia.

The resistance of *S. racemigerum* to *C. fulvum* has been shown by anatomical investigation to be due to the failure of the fungus to penetrate the epidermis and stomata. It is, however, capable of living in a saprophytic form on the leaves and producing conidia differing only in their smaller dimensions from those of the parasitic type. The part played by 'prohibitin' [loc. cit.] in the

immunization of *S. racemigerum* against *C. fulvum* cannot be conclusively defined on the basis of these preliminary experiments.

Agerberg (L. S.), Schick (R.), & Sengbusch (R. v.). **Die Bestimmung des Solaningehaltes von Pflanzen mit Hilfe von Cladosporium fulvum.** [The determination of the solanin content of plants with the aid of *Cladosporium fulvum*.]—*Der Züchter*, v, 12, pp. 272–280, 8 figs., 1 graph, 1933.

A highly sensitive indicator of minute traces of solanin in a leaf or fruit decoction of tomato or other Solanaceae is afforded by the behaviour of *Cladosporium fulvum* [see preceding abstract] in respect of conidial germination and length and extent of branching of the germ-tubes, the two latter characters being directly correlated. High germination percentages and long germ-tubes denote a low solanin content, low germination and short germ-tubes a high solanin concentration. By the use of this method the writers were able to determine the solanin content of over 100 tomato varieties (including Bonny Best, Danish Export, and Stirling Castle) and a number of other Solanaceae [which are enumerated]. The possibilities of extending the technique and of applying it to the practical aspects of plant breeding are discussed.

Vanine (S. I.). Курс лесной фитопатологии. Часть II. Бактериальные и непаразитарные болезни древесных пород. [Lectures on forest pathology. Part II. Bacterial and non-parasitic diseases of trees.]—150 pp., 87 figs., State Publishing Office of Agric. & Collective Farming Co-operative Literature, Moscow, 1933.

In this, the second part of his text-book on forest pathology [*R.A.M.*, xi, p. 78], the author deals rather summarily with the diseases of forest trees caused by bacteria, actinomycetes, algae, lichens, virus agencies, parasitic phanerogams, and environmental factors, such as noxious gases, factory smoke, unfavourable soil conditions, and the like. A special chapter briefly discusses the injuries of non-parasitic origin to felled and processed timber. The book terminates with an index of the Latin names of the hosts and parasitic organisms dealt with, and also of the foreign names of certain of the diseases.

Hartley (C.) & Boyce (J. S.). **The progress of forest pathology.**—*ex* '**A national plan for American forestry, Senate Document No. 12 (73d Congress)**.—pp. 695–722, 1 diag., U.S. Govt. Printing Office, Washington, 1933.

This account of the organization and progress of the American forest pathology service (in which the writers were assisted by S. B. Detwiler, E. P. Meinecke, W. W. Wagener, R. K. Beattie, L. S. Gill, and other members of the Division of Forest Pathology, Bureau of Plant Industry) is divided into three main sections, viz., forest deterioration by native diseases, the same by introduced diseases, and the present status of research and control. Much of the information here presented has been noticed in this *Review* from various sources.

Bidwell (C. B.) & Bramble (W. C.). **The Strumella disease in southern Connecticut.**—*Journ. of Forestry*, xxxii, 1, pp. 15–23, 1 fig., 1934.

Strumella coryneidea Sacc. and Wint. is stated to cause a very serious disease of oaks (*Quercus montana*, *Q. velutina*, *Q. borealis*, *Q. coccinea*, *Q. alba*, *Q. bicolor* and *Q. palustris*) in southern Connecticut, and has also been reported from several other States, and from Ontario, Canada; the fungus being probably indigenous to North America. Other hosts include hickory (*Hicoria glabra* and *H. ovata*), beech (*Fagus grandifolia*), red maple (*Acer rubrum*), and chestnut (*Castanea dentata*).

The first symptom is an inconspicuous yellowish discoloration of the bark, usually at the base of a dead branch; on the removal of the outer corky layers covering the lesion, a whitish mycelium may be seen as a thin mat. In the more advanced stages of the disease the lesions may be either of the 'canker' or 'diffuse' type, the former resulting from the annual production of successive ridges of callus as the lesion extends, and the latter developing when the fungus girdles the trunk too rapidly for callus formation. The elliptical cankers of the former type may attain a length of 60 in. and extend 24 in. round the circumference of the trunk. The dark brown, powdery sporodochia, 1 to 3 mm. in diameter, appear in large numbers on and beyond the bark of the original lesion, and produce an abundance of brown, irregularly globose to piriform, echinulate conidia, 7 to 12 by 4 to 7 μ, from the tips and sides of branched, brownish conidiophores. The fungus was readily isolated on various artificial media as well as on red oak-bark extracts but did not fruit in culture.

The percentage of oaks attacked was not observed to exceed 5·5, but seventy per cent. of the cankers occurred on the first 8 ft. of the stem, thereby rendering the butt log partly or wholly worthless. The cambium is killed and the wood underlying the cankers slowly decays. Most of the trees are infected before they reach the age of 20 to 25 years, vigorous individuals being as readily attacked as slow-growing ones. The early removal of diseased material should prevent the spread of infection.

Sibilia (C.). **Ulteriori notizie sulla resistenza dell' 'Ulmus pumila' a 'Ceratostomella ulmi' Buis.** [Further notes on the resistance of *Ulmus pumila* to *Ceratostomella ulmi* Buis.] —*Boll. R. Staz. Pat. Veg.*, N.S., xiii, 4, pp. 561–565, 1 fig., 1933. [English summary.]

In continuation of his investigations into the resistance of *Ulmus pumila* in Italy to *Ceratostomella ulmi* [*R.A.M.*, xii, p. 404] the author on 6th June, 1933, inoculated a further lot of 4- and 2-year-old *U. pumila* trees. After 165 days the inoculated trees still appeared to be perfectly normal and their growth was equal to that of the uninoculated controls, though the wood showed distinct traces of the growth of the fungus for a few cm. above and below the inoculation site. The *U. pumila* trees inoculated the previous year [loc. cit.] showed no outward sign of the disease.

In the vicinity of Florence and Bologna *U. pumila* trees and

seedlings growing in the midst of abundant natural infection have remained to all appearances perfectly healthy.

From these observations the author concludes that *U. pumila* is for all practical purposes resistant to *C. ulmi*.

TRUMBOWER (J. A.). **Control of Elm leaf spots in nurseries.**—*Phytopath.*, xxiv, 1, pp. 62–73, 3 figs., 1934.

The fungicides applied three times in 1932 in eight experimental plots of elm nursery stock at the Illinois State Natural History Survey, primarily against wilts [associated with a species of *Coniothyrium* and other fungi: *R.A.M.*, xii, p. 124], were shown to cause a considerable reduction (40 to 90 per cent.) in the incidence of three common leaf spots, *Gnomonia ulmea* [ibid., x, p. 632], *Gloeosporium ulmicolum*, and *G. inconspicuum*. Equally satisfactory results were obtained with 4–4–50 Bordeaux mixture, dry-wettable flotation sulphur spray, flotation sulphur dust, koloform, and kolodust [ibid., xii, pp. 504, 708].

KLEBAHN (H.). **Eine Blattkrankheit der Edelkastanie und einige sie begleitende Pilze.** [A leaf disease of the Chestnut and some fungi accompanying it.]—*Zeitschr. für Pflanzenkrankh. u. Pflanzenschutz*, xliv, 1, pp. 1–23, 14 figs., 1934.

Chestnut (*Castanea vesca*) trees near Bozen, South Tyrol, bore in October numerous yellow and brown, frequently confluent spots containing pycnidia with *Septoria*-like, mostly triseptate conidia, measuring 33 to 45 by 3 μ. In the following spring the affected leaves developed nearly spherical perithecia of a *Mycosphaerella*, 70 to 80 μ in diameter, together with other fungi. The perithecia contained asci 43 by 6 μ in diameter, and the hyaline, uniseptate, elongated, or fusiform ascospores, measuring 12 to 13 by 3 to 4 μ, gave cultures in which olive-green hyphae and elongated-cylindrical, fairly straight conidia, with three cross walls, measuring 32 to 48 by 2·5 to 3 μ, and agreeing with those of the *Septoria*, developed. Inoculation experiments with pure cultures from the ascospores produced spots which bore pycnidia on a few chestnut seedlings and confirmed the genetic connexion between the *Septoria* and the *Mycosphaerella*. The more or less spherical pycnidia were 70 to 100 μ in diameter, often tapering towards the ostiole, with a plectenchymatous wall not exceeding 12 μ in thickness, and contained relatively few *Septoria* conidia, together with numerous bacillary spores, 2 by 0·3 μ in diameter, which are regarded as microconidia. The conidial stage is considered to agree with *Septoria castanicola* Desm. and the *Mycosphaerella* genetically connected with it is regarded as a new species and named *M. castanicola*.

Taxonomic particulars are further given of various other fungi accompanying *M. castanicola* on the diseased chestnut foliage, including *Lophiotrema* (*Lophiosphaera*) *castaneae* n.sp., *Venturia* (?) *castaneae* n. sp., and *Chalcosphaeria pustula* (Pers.) v. Höhnel (*Hypospila pustula* [Pers.] Karsten) forma (?) *castaneae*.

CIFERRI (R.). **La 'rosetta' del Frassino coltivato nei pescheti rosettati.** [Rosette disease of Ash grown in affected Peach groves.]—*Boll. R. Staz. Pat. Veg.*, N.S., xiii, 4, pp. 554–560, 2 pl., 2 figs., 1 plan, 1933. [English summary.]

A description is given of the symptoms of nutritional rosette disease as observed on cultivated ash (*Fraxinus ornus*) growing in close proximity to peaches affected with the same disease [see above, p. 384]. The symptoms on ash closely resembled those on peach, except that on the former the disease progressed more slowly and the leaves remained a pale green. The soil was almost neutral (P_H 7·4 to 7·5) and poor in lime.

DAY (W. R.) & PEACE (T. R.). **Poplar canker.**—*Quart. Journ. of Forestry*, xxviii, 1, pp. 32–43, 2 figs., 1934.

Poplar canker [*R.A.M.*, xii, p. 127], attributed in various countries to at least 12 different fungi and bacteria, is quite common in England, where many of the cankers show no trace of fungal fructification. The bacterial type of injury, usually found on *Populus eugenii* Simon-Louis and *P. candicans* Aiton, is apparently the more serious form, but in every case the authors' isolations have yielded a number of different organisms, including species of *Micrococcus* and *Bacillus*.

On the more resistant poplars small cankers are usually confined to the twigs and small branches, to which they impart a knobby appearance. On more susceptible trees the size of the cankers largely depends on the age of the limb, and girdling may occur. Bacterial canker development begins in spring, continues into the summer, and may affect a part previously uninjured. The leaf node below a bud, or the bark where a side branch joins a large one, may crack, the crack extending downwards much more than upwards, and giving out a bacterial exudation. Two or three weeks later, microscopic examination shows large rents in the medulla and usually in the bud or shoot trace round which the injury occurred. Bacterial cavities are present in the cortex, phloem, cambium, xylem, and medulla, though the rents in the leaf or branch traces are generally free from them. Hyphae of undetermined species of fungi are always present in the dead outer bark. Many of these features are, however, typical of frost injury, and the cause of the disease remains obscure.

Owing to the prevalent confusion in the nomenclature, much uncertainty exists as to varietal susceptibility to canker. *P. canadensis* is frequently reported as cankered, but this name is used for most of the black Italian hybrids. The most susceptible species in England are *P. eugenii* and *P. candicans*, but *P. trichocarpa* Torr. and *P. generosa* Henry are also liable to be severely affected. Among the Lombardy poplars, *P. alba* var. *pyramidalis* Bunge, the fastigiate variety of white poplar, appears to be the most injured. Important, apparently resistant, species are *P. marylandica* Bosc., *P. angulata* Aiton, *P. robusta* Schneid. and *P. serotina* Hartig, all of the black Italian group; on the two last named small cankers occur on the twigs, but no damage ensues.

A bibliography of 10 titles is appended.

IYENGAR (A. V. V.). **Contributions to the study of the spike-disease of Sandal (Santalum album, Linn.). Part XV. The role of plant acids in health and disease.**—*Journ. Indian Inst. Sci.*, xvi, A, 13, pp. 139–152, 2 figs., 1 graph, 1933.

A comparative examination [by methods which are described] of the chemical composition of healthy and spike-diseased sandal (*Santalum album*) leaves [*R.A.M.*, xiii, p. 198] from southern India showed that the former contain more malic and much more oxalic acid than the latter; succinic acid, though abundant in spiked leaves, was absent from healthy ones or present only in traces. The disease disturbs the buffering capacity of the tissue fluids in the affected leaf, which contain more phosphates than those of the healthy leaf. Carbon dioxide is more actively produced in spiked than in healthy leaves, but cut shoots (with leaves) from diseased sandal gave off less carbon dioxide per unit weight than did similar healthy material.

MILLER (P. W.). **Fourth report of progress of studies on Walnut blight and its control in Oregon.**—*Twenty-fifth Ann. Rept. Oregon State Hort. Soc.*, pp. 139–152, 1934.

In further commercial spraying tests in Ohio satisfactory control of walnut blight (*Bacterium juglandis*) [*R.A.M.*, xii, pp. 182, 338] in grafted orchards was again given by two applications of Bordeaux mixture (3–3–50) made just before blooming of the pistillate flowers and immediately after, when the stigmas of the pistils were turning brown. In one orchard this treatment gave 8 per cent. infection, as against 41 and 60·9 per cent., respectively, for the trees sprayed once and those left unsprayed. In another test, the crop from trees sprayed three times and from those not sprayed averaged 36 and 18 lb. per tree, respectively. When delayed even for a few days, however, the second application was sometimes practically useless. If heavy rain falls after blooming, while the nuts are susceptible, a third spraying should be effected when they are about half an inch in diameter. The total cost, including labour, of spraying a tree 45 ft. high was 15 to 25 cents for each application, varying mainly according to the amount of foliage on the tree.

In seedling orchards, where variations in the period of flowering and especially the early flowering of some trees makes control much more difficult, moderate success resulted from two pre- and two post-blossom applications, this treatment in one instance giving 7·7 per cent. infection as against 23·2 and 87·2 per cent., respectively, for trees given three applications and those left unsprayed.

Leaf burn was reduced without loss of efficiency by the experimental use of excess lime Bordeaux mixture (3–9–50); ammoniacal copper carbonate (2–50) gave almost as good control as Bordeaux mixture (3–3–50), with relatively little spray injury.

COLE (J. R.). **Liver-spot disease of Pecan foliage caused by Gnomonia caryae pecanae nov. var.**—*Journ. Agric. Res.*, xlvii, 11, pp. 869–881, 7 figs., 1933. [Received April, 1934.]

An account is given of the author's investigation of the *Gnomonia*

leaf spot of pecan (*Hicoria* [*Carya*] *pecan*) recently reported from the southern United States [*R.A.M.*, xi, p. 213] and prevalent in 1931 in central Mississippi, Arkansas, northern Louisiana, and Texas, causing premature defoliation in some areas. The disease is favoured by high temperature and low rainfall, and attacks trees weakened through overcrowding or unfavourable soil conditions, though in the Red River Valley even vigorous trees are affected.

Entry is effected through the leaf stomata, and the first symptom consists in the appearance of umber or dresden-brown ('liver-coloured') spots, which may enlarge up to 1 cm. in diameter or coalesce, on the lower surface of the leaflets. Towards autumn they turn cinnamon-brown and become visible also on the upper surface, at which stage the leaflets usually fall.

The causal organism, the pathogenicity of which was experimentally established, has flask-shaped perithecia usually scattered singly or in groups of two or three surrounded by pycnidia and measuring 300 to 350 μ in breadth and 250 μ high, with beaks 200 to 250 by 50 to 60 μ. The hyaline, eight-spored, cylindrical, thin-walled asci, 45 to 50 by 6 to 8 μ, are furnished with a pore at the apex. The straight or curved, hyaline, 1-septate ascospores, 22 to 28 by 3 to 4 μ, have setae at both ends. The superficial, sub-globose, reddish-brown pycnidia are 75 to 300 μ in diameter, and the continuous, hyaline, curved, fusoid conidia, attenuated towards the apex, are 15 to 20 by 2 to 3·5 μ. The simple, hyaline, 1- to 2-septate conidiophores measure 18 to 25 by 3 to 5 μ.

The fungus shows some morphological differences from *Gnomonia caryae* Wolf on *Hicoria* spp. and is regarded as a distinct var., *pecanae*. Its imperfect stage is considered to be a *Leptothyrium* rather than a *Gloeosporium*, and differs sufficiently from the similar stage of *Gnomonia caryae* (*Gloeosporium* or *Leptothyrium caryae*) to be made a new var., *L. caryae* var. *pecanae*.

In culture the fungus grew best at 24° C. and between P_H 5·8 and 7.

The Schley and Georgia Giant varieties are highly resistant, and Stuart, Van Deman, and Pabst very susceptible.

At Shreveport, Louisiana, excellent control resulted from one application of Bordeaux mixture (4–6–50) at the end of May.

Davis (W. H.). **Twig blight (Hypomyces ipomoeae) of the American Bladder Nut.**—Abs. in *Phytopath.*, xxiv, 1, p. 6, 1934.

The tips of dead bladder nut (*Staphylea trifolia*) twigs were found to be spotted with the rose-coloured spore masses of *Hypomyces ipomoeae* [*R.A.M.*, ix, p. 376], apparently not hitherto recorded on this host. The blight first appears in mid-July and may destroy 50 per cent. of the root sprouts or girdle the main stem. Inoculation experiments gave positive results only on the buds and in the meristem. Perithecia were formed in the dead bark during late October and the ascospores germinated best in the following May. The mycelium can also overwinter in the stem.

Yoshii (H.). **Studies on Gloeosporium kawakamii Miyabe. IV. On the anthracnose of Paulownia tomentosa caused by Gloeosporium kawakamii Miyabe.**—*Bull. Sci. Fakultato Terkultura, Kjusu Imper. Univ.*, v, 5, pp. 523–545, 11 figs., 1933. [Japanese, with English summary.]

Paulownia tomentosa is stated to be widely attacked in Japan by a leaf and stem anthracnose due to *Gloeosporium kawakamii* [*R.A.M.*, xii, p. 375], the infection hyphae produced by the appressoria of which traverse the cuticle of the host and may occupy the epidermal cells within 24 hours. Necrosis may ensue after three days as a result of widespread infection by the mycelium. Severe injury from *G. kawakamii* is confined to young plants, in which the formation of wound phelloderm is not yet complete. *P. coreana* was found to be resistant to *G. kawakamii*, the hyphae of which succeed in entering the cells but are then repelled apparently by a combination of mechanical strength and anti-toxic secretions in the host tissue.

Dearness (J.) & Hansbrough (J. R.). **Cytospora infection following fire injury in western British Columbia.**—*Canadian Journ. of Res.*, x, 1, pp. 125–128, 1934.

In 1931, following a light ground fire near D'Arcy, British Columbia, a species of *Cytospora*, which appeared but was not definitely proved to be genetically connected with *Valsella pulcherrima*, was found on *Salix* sp., *Populus trichocarpa* [var.] *hastata*, *Betula fontinalis*, *Alnus tenuifolia*, *Cornus occidentalis* [*C. pubescens*], *Amelanchier florida* [*A. alnifolia*], *Crataegus brevispina*, *Rosa nutkana*, *Philadelphus gordonianus*, *Acer glabrum* [var.] *douglasii*, and *Sambucus glauca*. The fungus is provisionally named *C. pulcherrima* [with an English diagnosis] and is characterized by sparsely distributed, conical pustules, dark grey, erumpent cortical stromata, 1 to 1·3 mm. in diameter at the base, and allantoid, hyaline conidia, 3·5 to 4 by 0·75 μ, borne on filiform, fasciculate, or subdendriform conidiophores and issuing from the minute, black ostiole of the pycnidial chambers either as pale amber-coloured, hair-like tendrils or as darker corkscrews, horns, or beads. Douglas firs (*Pseudotsuga taxifolia*) in the affected area bore *C. friesii*, while an unidentified species with conidia measuring 6 to 8 by 2 μ and darker, coarser cirrhi than *C. pulcherrima* occurred on *Grossularia divaricata*, *Ribes sanguineum*, and *Rubus leucodermis*.

Christoff (A.). „Сѣченето" на иглолистния разсадъ и срѣдствата за борба съ него. ['Damping-off' of Coniferous seedlings and its control.]—Reprinted from *Горски Прегледъ* [*Forestry Review*], Sofia, xix, 9–12, 55 pp., 1933. [English summary.]

Damping-off of coniferous seedlings, chiefly caused by *Pythium de Baryanum* and *Rhizoctonia* [*Corticium*] *solani*, but also associated with numerous species of *Fusarium*, is stated to be very prevalent and destructive in the Bulgarian State forests near Sofia, where the losses accruing from it frequently range from 80 to 100 per cent. of the seedlings. After a brief description of the

symptoms, the author gives a detailed account of controlled experiments with a wide range of soil disinfectants, the results of which showed that most of the preparations used abroad, e.g., formalin, sulphuric acid, copper sulphate, and the like, are either too expensive or unsuitable for local conditions. Excellent results were obtained with a 0·001 per cent. solution of boric acid at the rate of 10 litres per sq. m., this being stated to be by far the cheapest disinfectant tried. Equally good results were obtained with a 1 to 1·2 per cent. acetic acid solution applied 7 to 10 days before sowing, or 0·1 to 0·2 per cent. applied immediately after sowing. It is pointed out that the efficacy of these two substances depends in a very large measure on the reaction of the soil; where the latter is highly alkaline, preference should be given to 0·2 per cent. mercuric chloride which was also shown to be very effective, but the general use of which is deprecated because of its relative high cost and toxicity to man.

Faull (J. H.). **The biology of Milesian rusts.**—*Journ. Arnold Arboretum*, xv, 1, pp. 50–85, 3 pl., 1934.

Species of *Milesia* (*Milesina*) are known to occur on 16 genera of Polypodiaceae and 11 species of *Abies*. The present paper records the writer's studies, conducted from 1924–7 in Ontario, Canada, and in 1933 at Harvard University, on the life-histories of *M. fructuosa*, *M. intermedia*, *M. marginalis*, and *M. polypodophila* [cf. *R.A.M.*, xi. p. 340]. The diploid stage (on the ferns) has been found somewhat narrowly restricted in host range, but the haploid, so far as is known confined to the genus *Abies*, is more polyphagous, *M. fructuosa* having been successfully inoculated by the writer on *A. amabilis*, *A. balsamea*, *A. cephalonica*, *A. concolor*, *A. fraseri* and its [var.] *prostrata*, *A. magnifica*, and *A. nephrolepis*. Teleutospores of *M. fructuosa* formed in the autumn required a resting period before germination could be induced at the onset of winter. Both this species and *M. polypodophila* are of some economic importance in hampering the natural reproduction of *Abies*, the former primarily threatening the development of *A. magnifica* and the latter that of *A. balsamea*.

Hiratsuka (N.). **On some new species of Milesina.**—*Bot. Mag.*, Tokyo, xlviii, 565, pp. 39–47, 6 figs., 1934.

Technical descriptions, supplemented by Latin diagnoses, are given of seven new species of *Milesina* [*Milesia*: see preceding abstract] found on various species of ferns in Japan.

Faull (J. H.). **A remarkable Spruce rust, Peridermium parksianum, n.sp.**—*Journ. Arnold Arboretum*, xv, 1, pp. 86–87, 1934.

A brief description, supplemented by a Latin diagnosis, is given of *Peridermium parksianum* n.sp., recently observed in California and Oregon attacking the current season's needles of *Picea sitchensis*. The broad-based spermogonia, triangular in vertical section, suggest that the diploid stage of the rust is probably a *Melampsoropsis*.

SIBILIA (C.). **La malattia della defogliazione della 'Pseudotsuga' da 'Rhabdocline pseudotsugae' Syd.** [Needle fall of *Pseudotsuga* caused by *Rhabdocline pseudotsugae* Syd.]—*Boll. R. Staz. Pat. Veg.*, N.S., xiii, pp. 591–600, 1933.

In this paper, based partly on Van Vloten's recent monograph [*R.A.M.*, xii, p. 63], the author gives a succinct account in semi-popular terms of the information at present available on needle fall (*Rhabdocline pseudotsugae*) of Douglas fir (*Pseudotsuga*) [*taxifolia*]. The chief points dealt with include the symptoms of the disease, mode of infection and spread, life-history of the causal organism, and varietal reaction to attack [ibid., v, pp. 637, 638; xii, pp. 64, 65]. To prohibit the importation of *Abies*, *Pinus*, and *Picea*, as was recently done in Italy [ibid., xii, p. 528], where, in any case, *Pseudotsuga* is only of very minor importance, appears to be a measure of excessive prudence, the fungus being a strictly obligate parasite [ibid., xii, p. 64] and the allegation that it attacks *Abies* unfounded [ibid., x, p. 571].

HUMPHREY (C. J.) & SIGGERS (P. V.). **Temperature relations of wood-destroying fungi.**—*Journ. Agric. Res.*, xlvii, 12, pp. 997–1008, 1 fig., 64 graphs, 1933.

This is a brief account of the results [presented in the form of graphs] of the authors' studies of the temperature relations in pure culture on malt extract agars under controlled conditions of 64 species and strains [an alphabetical list of which is given] of wood-destroying fungi, most of which are common in the United States and Cuba, while several are cosmopolitan. Of this number, 12 were found to have optimum temperatures of 24° C. or below, 42 between 24° and 32°, and 10 above 32°. The maximum temperatures for growth were determined for all but two of the cultures used in the tests, with the result that 62 stopped growth at 46° C. or below, 46 at 40° or below, and 24 cultures at 34° or below. The growth of about 85 per cent. of the species and strains was prevented within a range of 12° above the optimum but there was no definite relationship between the optimum, and the maximum temperature totally inhibiting growth, the latter being apparently specific to the organism concerned. With one exception, all species showing a difference of 6° or less between the optimum and maximum temperatures had their optimum at 32° or below. Many of the organisms showed a rapid growth over a considerable range of temperatures around the optimum, and these tolerated a high maximum temperature, 12° to 16° above the optimum. A downward shifting of the optimum temperatures for growth [cf. *R.A.M.*, ii, p. 565] for successive 7-day observation periods was noted in the case of certain of the cultures studied, suggesting that the optimum temperatures for certain wood-destroying fungi under controlled conditions are higher than the optima for the same rots in nature carried over long periods.

ANDERS (G.). **Warum Hausschwammbekämpfung?** [Why combat dry rot?]—*Ratschläge für Haus, Garten, Feld*, viii, 11, pp. 181–184, 6 figs., 1933. [Received March, 1934.]

In 1929 the writer investigated a particularly severe attack of

dry rot [*Merulius lacrymans*] in an unoccupied room, the fungus advancing at the rate of 1 cm. daily. Its further progress was completely barred by treatment with antinonnin [*R.A.M.*, xi, p. 84], the application of which at a strength of 3 per cent. to walls, joists, and other parts liable to infection is accordingly recommended. The preparation should also be used at the same concentration instead of water for mixing the cement mortar in constructions liable to dry rot.

KORFF (G.) & BÖNING (K.). **Krankheiten und Schädlinge im Gemüsebau in Bayern im Jahre 1933.** [Vegetable diseases and pests in Bavaria in the year 1933.]—*Prakt. Blätter für Pflanzenbau und Pflanzenschutz*, xi, 9–10, pp. 240–243, 1933–4.

Notes are given on the prevalence and distribution in relation to meteorological conditions of some well-known diseases and pests of vegetables occurring in Bavaria in 1933.

WALKER (J. C.). **Diseases of Cabbage and related plants.**—*U.S. Dept. of Agric. Farmers' Bull.* 1439, 28 pp., 14 figs., 1934.

Popular notes (superseding those contained in the former bulletins on the same subject, 925 and 1351) [*R.A.M.*, vi, p. 590] are given on the symptoms, etiology, distribution, and control of a number of fungous, bacterial, and physiological diseases of cabbage and related crops in the United States.

WOODMAN (R. M.), BRENCHLEY (G. H.), & HANLEY (F.). **Soil treatment for Brassicae. I. The effect of sterilisation of the soil by mercuric chloride on the seedling growth of Brussels Sprouts.**—*Journ. Soc. Chem. Ind.*, liii, 4, pp. 35T–36T, 1934.

Significant reductions in the dry weights of the tops, roots, and total seedlings of Cambridgeshire Champion Brussels sprouts followed the sterilization of the seed-beds at the Cambridge Horticultural Research Station with 0·05 to 0·2 per cent. solutions of mercuric chloride against *Plasmodiophora brassicae* [*R.A.M.*, xii, p. 412]. Low concentrations of the disinfectant were found to affect the roots much more seriously than the tops, so that the top to root ratio is significantly greater than the equivalent for normal seedlings in untreated clean soil, the root thus maintaining a relatively larger top. With stronger solutions the root system is still more severely damaged but the effect on the tops is then so marked that the ratio does not differ appreciably from that of the untreated controls, a normally proportioned but smaller seedling being obtained.

OSBORN (T. B.). **Incubation period of Pea mosaic in Macrosiphum pisi.**—Abs. in *Phytopath.*, xxiv, 1, p. 15, 1934.

The pea aphid, *Macrosiphum pisi*, has been used as a vector in the transmission of pea mosaic to broad beans [*Vicia faba*], garden peas, sweet peas, and Canada field peas, the first named being used in the majority of the trials [*R.A.M.*, xii, pp. 414, 741]. After feeding on diseased pea plants the aphid acquired the capacity (retained throughout the active feeding life) to transmit infection. The

incubation period of the pea mosaic virus within the insect was found to range from 12 to 28 hours.

SNYDER (W. C.). **Pod deformation of mosaic-infected Peas.**—*Phytopath.*, xxiv, 1, pp. 78–80, 1 fig., 1934.

In California the pea mosaic [see preceding abstract] virus causes marked distortion of the pods. The ovary wall becomes corrugated and in severe cases the almost unrecognizable stunted and distorted pod produces no seed. The foliage symptoms of the disease correspond in the main with those described from Wisconsin by Doolittle and F. R. Jones [*R.A.M.*, v, p. 337], ranging from simple mottling to extreme twisting, dwarfing, curling, or even rosetting, sometimes extending to the petioles, tendrils, and stems. The loss from pod distortion may amount to 10 per cent. or more of the crop.

VESTAL (E. F.). **Pathogenicity, host response and control of Cercospora leaf-spot of Sugar Beets.**—*Iowa Agric. Exper. Stat. Res. Bull.* 168, pp. 43–72, 10 figs., 1933.

In pure culture on artificial media conidia of *Cercospora beticola* from an infected leaf of sugar beet in Iowa began to appear in 12 to 20 hours after isolation or transfer, optimum production taking place 48 to 96 hours after transfer. Germination took place at any point, but usually near a septum and from the basal end of the cell first. On the living leaf the conidia did not germinate in atmospheres of under 90 per cent. humidity, though at 96 per cent. all germinated. An air humidity of 75 per cent. was necessary before conidial formation could take place, and increasing humidity from 75 to 96 per cent. produced an increase in conidial length from 100·4 to 185·2 μ. The leaf is entered through the stomata but many germ-tubes passed over stomata without entering. Penetration was unaffected by changes in atmospheric humidity. Seedlings were more readily infected than mature plants.

Twenty-six species of plants belonging to twelve widely separated families were successfully infected in the greenhouse by spraying with conidial suspensions of *C. beticola*. In the field six species of plants in six widely separated families were found to be infected with a *Cercospora* morphologically and pathogenically similar to *C. beticola*, and evidence was also obtained that the beet leaf spot fungus may live saprophytically in the field on leaves other than those of sugar-beet.

Planting in rows 20 in. apart gave a greater yield of beets than did planting in rows either 12 or 24 in. apart, and retarded the spread of infection by about 10 days as compared with the 12 in. spacing, resulting in a reduction in the number of dead leaves by 16 per cent.

The use of machinery, by rendering cultivation more rapid and uniform than with manual labour, gave much more effective control of weeds and maintained a lower humidity among the beet leaves, thus assisting control of the leaf spot.

A bibliography of 50 titles is appended.

DOOLITTLE (S. P.) & WELLMAN (F. L.). **Commelina nudiflora, a monocotyledonous host of a Celery mosaic in Florida.**—*Phytopath.*, xxiv, 1, pp. 48–61, 3 figs., 1934.

An expanded account is given of the writers' studies on the part played by *Commelina nudiflora* in the spread of celery mosaic by *Aphis gossypii* in Florida [*R.A.M.*, xii, p. 136]. In one instance the virus was also found infecting *Physalis lagascae* [*P. minima*].

BÖNING-SEUBERT (E.). **Die Mosaikkrankheit der Gurken.** [The mosaic disease of Cucumbers.]—*Prakt. Blätter für Pflanzenbau und Pflanzenschutz*, xi, 9–10, pp. 219–221, 1933–4.

A semi-popular account, based mainly on American investigations, is given of the symptoms, etiology, transmission, and control of the mosaic disease of cucumbers, which is stated to be responsible for heavy damage in German glasshouses, without having so far aroused much attention.

Legislative and administrative measures.—*Internat. Bull. of Plant. Protect.*, viii, 1, pp. 11–15, 1934.

GERMANY. Paragraph 8 of the new edition (24th October, 1933) of the Convention for the commerce in potatoes in Germany established at Berlin ('Berliner Vereinbarungen') contains regulations governing the commerce in seed potatoes [cf. *R.A.M.*, xii, p. 653]. No notification is required if the percentage of total visible disease is below 0·5, a reduction of price is imposed if the percentage is between 0·5 and 4, and above 4 there is a right of refusal. Slight skin lesions or scab [*Actinomyces scabies*] covering less than 10 per cent. of the surface do not require notification, while over 3 per cent. of wet rot permits of refusal.

ITALY. The regulations embodied in the Royal Decree No. 1700 of 12th October, 1933, provide (*inter alia*) for the formation of a central bureau for plant protection under the Ministry of Agriculture and Forests, which will utilize the following organizations for the services of inspecting, reporting, and treatment of diseased plants: Committee for Plant Protection, Institutions for Research and Scientific Experimentation in Phytopathology, Observatories for Plant Diseases, and Provincial Commissariats for Plant Diseases [cf. ibid., viii, p. 480].

United States Department of Agriculture. Bureau of Plant Quarantine. Rice Quarantine No. 55. Revision of quarantine and regulations.—4 pp., 1933. [Received March, 1934.]

With a view to preventing the introduction into the United States of certain injurious fungous diseases of rice, including downy mildew (*Sclerospora macrocarpa*), leaf smut (*Entyloma oryzae*), blight (*Oospora oryzetorum*), and glume blotch (*Melanomma glumarum*), the present revision, effective 23rd November, 1933, of Quarantine No. 55 [*R.A.M.*, xii, p. 464] prohibits the importation from any foreign country except Mexico of seed or paddy rice, rice straw, or hulls, while seed or paddy rice may only be procured from Mexico under permit.